The Builder.

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A Tour in the Weldon Stone District.

ON Friday, the 19th inst., a large party of guests, including several well-known architects, accepted an invitation from the Earl of Winchilsea and Nottingham to visit the Weldon stone quarries and some of the ancient houses built of the stone from these quarries, notably Kirby Hall, once the home of the Winchilsea family.

It was in brilliant sunshine that the Earl stood in the grass-grown court of the beautiful house wherein his predecessor was born, and received his guests assembled from all parts of England. As the sunshine fell on the roofless walls, and lit up the delicate carving, which three centuries of existence and half a century of neglect have hardly impaired, it was impossible to repress a feeling of sadness that so fair a house should have been abandoned to decay. And yet, when the difference between the habits of these days and those of the time when John Thorpe laid the first stone is considered, one can hardly wonder that a place so remote and so inconvenient should have been deserted for more cheerful, more commodious, and more accessible homes. It is little more than fifty years since the family finally left Kirby to itself, but in that time destruction has been wrought that only a princely fortune can repair. Restoration, as Lord Winchilsea said, is at present out of the question, but preservation fortunately is not; and it will give pleasure to all who know Kirby Hall to learn that means have already been taken to prevent further decay, and that "Time's fell hand" is to be stayed in its work of defacement.

Of all the mansions of England, Kirby, perhaps, offers the greatest variety of stately grouping and beautiful detail. Here may be seen, in a more striking manner than anywhere else, the meeting of the Early and the Late Renaissance, the work of John Thorpe and of Inigo Jones side by side. Being so fine a place as it is, it is curious to find so few references to Kirby in the usual sources of information on notable buildings.

Bridges mentions it in his "History of Northamptonshire" at the beginning of the eighteenth century; but Norden, in his "Delineation" of the county, published in the early years of the seventeenth century, does not say a word about it, although his little book is dedicated to Sir William Hatton, who owned Kirby at the time, and he, moreover, gives a list of the principal seats in the county, many of which were far inferior to Kirby in point of importance.

We do get a reference from Evelyn, who visited the place on Aug. 25, 1654, and writes: "I went to see Kirby, a very noble house of my Lord Hatton's in Northamptonshire, built *à la moderne*, the garden and stables agreeable, but the avenue was ungraceful and the seate naked." But Walpole, who went everywhere, has nothing to say of Kirby, and we sadly miss the continuous references which do so much to enliven the history of most of the notable houses of the country.

One very important record, however, we have—in the shape of the preliminary plans made by John Thorpe, on one of which he has written, "Kerby wherof I layd y^e^ first stone A° 1570." It has frequently been stated by those who have not investigated the subject that there is some doubt whether this is the Kirby referred to, or whether it was not a Kirby Castle, in Middlesex, now completely destroyed. It is only necessary to compare these plans with the building itself to see that they represent the Northamptonshire Kirby, but not exactly as we see it now. They are like it in the main, but with certain obvious differences which preclude the supposition either that they were the plans from which it was actually built, or that they were made from a survey after it was finished. Most likely they are preliminary sketches, for the ground and upper plans do not even exactly agree with each other. An examination of them with the building seems to point to its having been built at three periods. First, there is the beginning of the work in 1570, a date confirmed by various inscriptions on the building itself, all of them on the west front of the courtyard, where the dates 1572, 1575 occur on the parapet and over the porch. Here also is the name HVM—FRE STA—FARD, and the motto, "Je serai loyal." The Stafford crest, a boar's head rising out of a ducal coronet, may be seen, together with the Stafford knot and other devices of the family, all round the main courtyard on the parapet, from which we may conclude that the whole of the courtyard was built by the Staffords between 1570 and 1575. And we gather that it was rendered habitable inside by them, since their devices, carved in oak, adorned the ceilings of some of the rooms.

But only seven years after the laying of the first stone it had already passed from the Staffords to Sir Christopher Hatton, the celebrated Lord Chancellor before whom the seals and maces danced; and in the year 1580 Sir Christopher wrote to Sir Thomas Heneage that he was going to take his way to Sir Ed. Brudnell's to view his house of Kirby, which he had never yet surveyed.

The house, therefore, did not long remain in the hands of the first builder.

The second period of building seems to have occurred in 1590, just before Lord Chancellor Hatton died. We know that the stables (now completely gone) bore the date 1590; and an examination of the house shows that the character of the masonry differs in certain places, notably in the wings projecting on the south-west face. The general detail is still Elizabethan, but the treatment of the quoinstones is perceptibly different from those in the older work. Thorpe indicates such alterations on his plans, and we may conclude that Sir Christopher employed him to enlarge the house which he had designed for Sir Humphrey Stafford twenty years before.

The third period is ascertained by the dates on the building, 1638 and 1640, when various windows were inserted under the superintendence of Inigo Jones, who also remodelled the north-west or entrance front. It must not be supposed that he built the whole of this north-west front entirely anew, for the arcade is shown on Thorpe's drawing, and the Stafford badges occur all along it, thus showing that the bulk of it belongs to the earliest period. The work done at the third period may also be distinguished by the presence of the Hatton arms, the three garbs.

Subsequently to Inigo Jones there was a great deal of woodwork put up throughout the house; but the external appearance of the place indicates, as already said, in a striking degree, the meeting of the two phases of Renaissance architecture—the early under John Thorpe, and the late under Inigo Jones.

After a luncheon in the great hall, which for many a long year had not witnessed such a gathering, presided over by the head of the house, the party moved on to the quarries, where the qualities of the stone were fully investigated. To judge from the extent of the irregular mounds and hollows which adjoin the village, Weldon must once have been the centre of a large stone industry, but during last century the demand lessened, the great lines of transport left the place at a distance, and the quarries were almost deserted.

They were worked enough to keep alive the knowledge of the stone, but large orders were impossible, for no means existed to fulfil them. Now, however, that a new railway runs within two miles of the quarry, the stone can be delivered in plenty on the rails at rates which render it able to compete in any market. The stone itself (*experto crede*) is a pleasant one to use. It works easily, but acquires a very hard face by exposure. Its colour is pleasant to begin with, and in course of time the kindly lichens cover it with a beautiful coating of grey and gold, such as may be seen in perfection on the Triangular Lodge at Rushton.

There appear to be four beds of stone, which occur in ascending order, as follows:—

1. "Ragstone," varying from 2 ft. to 6 ft. or more in thickness, used for steps, flooring, walling, &c. 2. "A bed," principally employed for ashlar. 3. "A^1 bed," quarried for ashlar and mouldings, carvings, &c. This is considered to be the best quality stone. 4. "B bed," worked for ashlar.

The thicknesses of the beds 2, 3, and 4 are extremely variable, and they are not usually all met with in one quarry. The average total thickness of the three may be taken as about 18 ft. A remarkable feature is the size of the stones as they lie on the flat. On entering the principal quarry we measured one 9 ft. by 3 ft. by 4 ft., but soon found that this was only a small specimen of what could be obtained. After the rough ragstone is removed, the blocks are sawn *in situ*, the saws being aided in the operation by water. Some of the blocks, however, are small enough to be forced out by steel wedges in the ordinary way. About thirty men are employed in the two quarries now open.

We will now proceed to describe the stones in detail. They are found in the geological formation known as the "Lincolnshire Oolite," which is also extensively worked at Ketton, Clipsham, Stamford, Casterton, Wansford, &c. All the four beds found at Weldon are limestones, distinctly oolitic in structure. Under the microscope, thin sections show that they are made up of little egg-shaped or ovoid grains, upon the size of which the grain of the rock almost entirely depends. These little ovoid bodies are worthy of particular notice. We have frequently, of course, observed them in other limestones of a similar character to that of Weldon, but the structure is so admirably developed in beds 2, 3, and 4, that it materially assists us in judging of the durability of the stone. These minute spherules are made up of carbonate of lime, and the microscope shows that in each grain the lime is arranged in layers, concentrically disposed, like the successive coats of an onion, usually having some object in the centre, such as a fragment of shell or other foreign matter. Very minute lines radiate from the centre to the circumference of the body. These spherules are believed to have been formed in water saturated with carbonate of lime, the fragment of shell or sand now seen in the centre having acted as a nucleus around which the carbonate of lime was deposited while the grain was rolling gently about on the bottom of the sea. It would appear, however, that this oolitic structure is sometimes produced by other causes. In addition to the egg-shaped grains being of variable size in the different kinds of Weldon stone, innumerable fragments of shells occur, especially in bed A and the ragstone. The microscope shows that this shelly matter is crystalline calcite. So far we have only analysed the nature of the particles composing the stone, and we find that in all four examples oolitic grains occur, the bed A^1 being made almost wholly of them, whilst the ragstone and bed A are mixed with a considerable proportion of shelly matter, bed B being an intermediate variety between the two kinds. The two last-mentioned varieties have small cavities pitted over them which are not due to the weathering-out of shell-particles, as is commonly the case with oolites, but are merely the insides of shells which have either never been filled with anything, or the mineral which occupied them has been removed by the action of solvents. In dealing with durability, this is important to remember, because, if the shelly matter itself had been removed and the cavities were due to this, the whole stability of the stone would be affected, and it would soon manifest itself by general decay. But it is evident that oolitic grains and shell-fragments cannot of themselves form a compact stone, any more than can grains of loose quartz sand make a sandstone; something is required to cause them to adhere to each other. Nothing but the microscope can possibly determine the nature of the cementing material, and it will easily be understood that the compactness and durability of the stone also largely depend upon the character of this cement. In the Weldon stone we find that in all the varieties it is calcite; but whereas in beds A, A^1, and B this mineral is amorphous, or, in a measure, only sub-crystalline in its disposition between the grains, and does not wholly fill up the interstices between the particles, in the ragstone the calcite is crystalline, filling up every little space, and rendering the stone so compact that it can be polished. Indeed, many of the marble slabs and chimney-pieces in some of the principal houses in Northamptonshire are made of polished ragstone. It is interesting also from a commercial point of view to note that the bed A^1, if not the other two beds also, occasionally contain hard concretions, which seem to have been formed by the calcite becoming more concentrated and crystalline at such points. We need hardly mention that these concretions do not detract from the durability, though they must add somewhat to the cost of working the stone. Neither are they sufficiently numerous to deserve more than a passing notice. Speaking generally, the fragments of the three freestone beds are cemented together by just enough calcite, of a sub-crystalline texture, to render them easily worked. The colour of the beds is light cream, but streaks of light blue also are everywhere seen in the ragstone.

We have not seen a chemical analysis of the Weldon stone, but from our microscopical analysis we should think, taking the best bed, A^1, as a type, that it contains about 93·5 per cent. of carbonate of lime, 3 carbonate of magnesia, ·75 iron and alumina, and a slight trace of bitumen, the rest being water and loss. Its crushing weight, as tested by Messrs. Kirkaldy & Son, is 140·3 tons per square foot. About 16 ft. of Weldon stone go to a ton.

A description of a stone conveys but little information unless it is comparative; and only stones of similar character should fairly be compared, except the comparison embraces a general view of the different classes of stone. The Weldon stone being an oolite, we shall compare it with other oolites from different parts of the country. The following table is derived from various sources, but principally from the "Report on the Selection of Stone for building the New Houses of Parliament":—

Name of Stone.	Carbonate of Lime.	Carbonate of Magnesia.	Silica.	Iron and Alumina.	Water and Loss.	Bitumen.	Specific gravity.	Colour.	Remarks.
Weldon	93·50	3·00	0·00	0·75	2·75	a trace	2·085	Cream and light brown	Medium and small oolitic grains, cemented by sub-crystalline calcite, crystalline in concretions. Coarsely laminated in parts.
Ancaster	93·59	2·90	0·00	0·80	2·71	a trace	2·182	Ditto.	Small oolitic grains, cemented by sub-crystalline, or crystalline calcite.
Ketton	92·17	4·10	0·00	0·90	2·83	a trace	2·045	Heavy cream	Medium oolitic grains, few shells, cemented by sub-crystalline calcite.
Barnack.....	93·40	3·80	0·00	1·30	1·50	a trace	2·090	Very light brown	Compact, roughly laminated, shelly oolite, sub-crystalline calcite cement.
Bath Box	94·52	2·50	0·00	1·20	1·78	a trace	1·839	Cream	Fine oolitic grains, with shell fragments, cemented by earthy carbonate of lime.
Doulting	95·89	0·11	2·04	1·64	0·32	—	2·430	Light brown	Very compact, oolitic grains some with quartz-sand nuclei, and small shell fragments, with a calcareo-siliceous cement.
Portland	95·16	1·20	1·20	0·50	1·94	a trace	2·145	Whitish brown	Oolitic grains, many with quartz-sand nuclei, cemented by crystalline carbonate of lime.
Chilmark	79·00	3·70	10·40	2·00	4·20	a trace	2·481	Light greenish brown	Oolitic grains with quartz-sand nuclei occasionally, and shell fragments, cemented partly by sub-crystalline calcite, and partly by amorphous silica.

All the stones referred to in the foregoing table are fair average specimens of the best quality.

Examining the table, we notice that the Ancaster, Ketton, and Barnack stones, all found in the same district as the Weldon, contain no silica. We failed by the aid of the microscope to detect any also in the last-mentioned stone. On the contrary, the Chilmark stone contains a very considerable proportion of silica, much of which, however, does not affect its durability either one way or another, being largely present as nuclei of the oolitic spherules. We mention this, because some people think that to get a high percentage of silica in a limestone is a good criterion of its superior durability. Our readers will understand, therefore, how little a chemical analysis can assist in determining the durability of a stone in this respect; it is unable to state how the silica is disseminated throughout the stone. Another item to be noticed is that a chemical analysis cannot determine the kind or degree of crystallisation of the carbonate of lime, so that the analysis of a crystalline calcite shell, which is hardly affected by the country atmosphere, is identical with that of an arragonite shell, which is easily weathered, causing the stone to break up. The chemical composition of calcite and arragonite is identical, but the microscope determines the difference between the two. The shells of the Weldon stone are barely affected by country air, and stand out when the matrix is weathered; whilst the majority of the Bath stone shells—all that we have examined—are made of the less crystalline form of the mineral. Many other interesting points of comparison could be raised, but this is hardly necessary in the present instance.

During the day we very closely noted the effects of the atmosphere on the stones of the buildings visited. It is assumed that these edifices were all made largely of Weldon stone, but as stone of similar nature is found in the district, this is not absolutely proved, although from the extent of the ancient Weldon workings, it is most probably the case. There is very little doubt, however, that Kirby Hall is built of it. We recognised at least three of the four worked beds in various parts of the building. The stones forming the large pilasters, fluting, and rich capitals were, generally speaking, in most excellent condition; the mouldings and the bands of carving, flowers, with the Stafford knot and Hatton crest, conspicuously seen round the quadrangle, are also almost as sharply defined as on the day they were cut. There are very few flaws in the masonry of the more exposed parts on the top of the building; but some of the rich carving, especially at the base of the two pilasters on either side of the main entrance, inside the quadrangle, is not in such good condition. One of the outer entrance-gates is not in a very good state of preservation. That part of the building made of ragstone is in good order. Speaking generally, it is remarkable that, after the lapse of three

hundred years, the stone of a great portion of the mansion is in such an excellent condition. Much of it is covered with lichens.

In the villages passed through, the angles of buildings were noticed by everybody to be very sharp and clean. The stone of Geddington Cross, also visited, was found to be in fair condition. The cross has lost its crowning pinnacle, and the crocketted heads of the highest remaining stage are somewhat insecure, but, except for this and for a certain amount of wear round the lowest stage, against which many generations of children have rubbed, the structure has come down to us untouched from the thirteenth century. It is triangular on plan, each side being slightly bowed out in the middle. The base, or shaft, is covered with spirited diaper-work of various designs; above this are three canopied niches, in each of which stands a figure of the queen, clad in grave and simple drapery; above the niches the structure gradually tapers upwards in stages, still preserving the triangular arrangement of its plan. It is a curious and striking monument, and, standing as it does in the middle of an open space at the meeting of three roads, it shows itself to great advantage.

At Rushton Hall it was noticed that the stone in the base of the building was, in some parts, in a very advanced state of decomposition; but we are decidedly of opinion that the decayed stone did not come from Weldon. It is much larger grained than any of the beds at the latter place, and when closely examined has a very different appearance. The upper portions of the house were in a much better state of preservation. From what could be seen, and from our examination, we should think that Weldon stone is a very good material for country buildings; and even in the atmosphere of London there is no reason why it should not be found to be as serviceable as any of the better classes of limestones, though none of these latter, as we have frequently had occasion to remark, are particularly noted for being durable in our smoke-begrimed Metropolis.

The sun was already touching the earth as the party drove up to the beautiful façade of the Hall. There was just time, however, to walk up through the long shrubbery, past the walk where Dryden paced when musing over the "Hind and Panther," past an open summer-house, whence (an inscription tells us) the "straining eye" is able to see the field of Naseby; and so on to the Triangular Lodge. It is a curious building, this lodge, covered with all manner of devices, some heraldic, some religious, some unintelligibly mystic, all set amid architectural details of great character and originality, but the sight of which might be expected to entail syncope on the purist. Amid the many legends that attach to this quaint building may be mentioned one which attributes the excellence of its masonry to the fact that the mortar was mixed with beer!

Rushton Hall is one of the best examples of Elizabethan architecture which remain to us. It is built round three sides of a court, across the fourth side of which stretches a one-storied corridor. The effect of this arrangement in approaching the house is very happy, as the long and low corridor permits a view of the receding wings, whereof the straight lines of the parapets are broken by little gables at intervals. The details, moreover, are all simple and rational; there is nothing forced nor bizarre; the whole effect is obtained by a judicious withholding of the hand.

Rushton was for several centuries the home of the elder branch of the Tresham family. To one of them we owe the earliest parts of the house, of which the great hall and its circular bay, as well as much more of the two lower stories, date from the fifteenth century. In course of time arose the greatest builder of the race, Sir Thomas Tresham, who not only has left us three separate buildings, each full of interest,—namely, the Triangular Lodge, Rothwell Market House, and Lyveden New Building,—but also a considerable part of Rushton Hall, which he greatly enlarged. His work is adorned, as usual, with the date (1595), and the trefoil of the Treshams, the "foliis languentibus herba," as one of the race calls it in his epitaph. Close to it, and in gables of similar detail, occurs a wholly different coat-of-arms, under the dates 1618, 1626, and others. The new arms are those of the Cokaynes, and in the juxtaposition of the two coats is involved one of the best-known events of English history. For the eldest son of Sir Thomas was Francis Tresham, whose letter to his brother-in-law, Lord Mounteagle, was the means of discovering the Gunpowder Plot. Francis was imprisoned and his estates were confiscated and sold to the Cokaynes, who completed the house in accordance with the prevailing style, and made it their home till the beginning of this century. They were a hard-living race, and fell at last the victims of their own extravagances, and their beautiful house passed to others better able to preserve it.

The history of Rushton is too long to tell here and now,—the growth of the hall, the making of the ornamental waters, the erection of the open-air bath, over which a melancholy nymph still presides in classic chilliness. Or the destruction of one of its two churches, and the removal of some of the monuments to the other, where a good recumbent effigy of Sir Thomas Tresham, the last Prior of the Order of Saint John of Jerusalem, is still to be seen. Nor had the party time to see these things, nor even to complete the contemplated programme; for Rothwell Market-House and the fine, though somewhat decayed, church had to be omitted, and the party were obliged to perform a hasty movement to Rushton station, whence a few minutes brought them to Kettering, where they dispersed.

It was then too late for them to see the very fine tower and spire of the church, which was restored last year, and, for some 30 ft. from the top, rebuilt in Weldon stone. Advantage was taken of the scaffolding erected at that time to make a carefully-measured drawing of the whole tower and spire, a reproduction of which we are enabled to present to our readers this week. The church itself has no great pretensions to beauty, although the nave arcade is fine and the whole interior is spacious; but the tower and spire are hardly to be equalled anywhere for the graceful manner in which they taper upwards, and for the elegant proportion of their stages. The castellated turrets at the angles are curious as embodying a conventionalised adaptation of defensive design, and as helps to the general composition they are invaluable, rendering the outline of the structure pleasing from whatever point of view it may be seen. There is nothing to fix the date of the church beyond the character of the work, which in the case of the tower and spire points to the middle of the fifteenth century.

THE TEMPLE OF APOLLO AT DELPHI.

IN his travels about Greece, the ancient writer Pausanias seems to have preferred a land route wherever the alternative presented itself of going part of the way by sea. It was so on his visit to Delphi. Yet there are many reasons for approaching Delphi rather from the sea, from the small port of Itea. The ascent is by no means tedious, and at length, when the site of the ancient city is reached, the cliffs that shelter it stand out in all their stupendousness. At such a moment the impression of natural grandeur is one never to be forgotten. From the foot of these great cliffs the ground at one place slopes quickly down towards a deep ravine. To build on that spot implied the construction of a level platform, with a retaining wall towards the ravine. How many walls of that kind there may still be under the village of Delphi (or Kratis, as it is now called) it is impossible to conjecture. But there is one of them still to be seen. It is, in fact, one of the most attractive features of the ruins as at present visible. We mean the so-called Pelasgic wall. It is not Pelasgic, nor polygonal, in a true sense, because its face has been worked smooth, and covered with ancient inscriptions. The articulation of the blocks is polygonal, and that is all.

On the platform, supported along its steepest side by this wall, the temple of Apollo is believed to have stood. The inscriptions on the wall, of which many are records of the enfranchisement of slaves, are just such as would be expected on a temple of Apollo at Delphi. The locality is just that on which we should expect to find the famous temple. Fragments of columns have been found, and now Prof. Middleton, having measured them when he was exploring the site some years ago, produces a sketch for the restoration of the temple. He diffidently thinks that his sketch may be premature, the general notion being that we are on the eve of fresh excavations on the site by the French School at Athens. But the preliminary arrangements for these excavations have been so long impeded by the Greeks that there is little expectation of their being speedily begun. One thing is certain, that the first day's work in following up the Pelasgic wall will bring to light things of the utmost importance. Let us hope that a kindly fate has preserved the sculptures as well as the more strictly architectural features.

The sculptors were, first, Praxias, who left his task incomplete; and, next, Androsthenes. Both were Athenians, and of Praxias it is told that he had been a pupil of the famous sculptor Kalamis. We learn this from the traveller Pausanias (x., 19, 3), who tells us also that in the pediments were represented Artemis, Leto, Apollo, the Muses, the setting of Helios, Dionysos and the Thyiades. How these figures were distributed in the two pediments he does not say. To the poet Euripides, however, we owe an inspiring sketch of the sculpture of the temple ("Ion," v. 187 fol.). It did not suit his purpose to refer to the pediment figures in any special manner. He was dealing in the "Ion" with a plot which turned on Kreusa with her drops of Gorgon's blood, and any reference he could introduce in the early part of the drama to beings of a serpent or semi-serpent nature would serve as a prelude. He points first to Herakles slaying the Hydra, next to Bellerophon slaying the Chimæra, and then goes on to specify deities slaying giants, which, in art, were usually of anguipede form. It has been generally supposed from his noticing these scenes as as if they formed separate groups, that he was thinking of the metopes of the temple, and, no doubt, that is a fair inference as regards Herakles with the Hydra, and Bellerophon with the Chimæra. We may assume that he has selected these groups, appropriate to his drama, from the metopes. But the case is different when he proceeds to the fight of gods and giants. There his words imply a crowd of figures. He says: "Look at this tumult of giants on the walls." In a series of metopes there could be no tumult of figures; nor could metopes be on the walls. The alternative is to take the poet as referring to the frieze of the temple when he thus speaks of a war between gods and giants. We conceive the chorus as standing in front of the temple and looking up at its sculptures, noticing first the pediments in a general way, and next the metopes, among which they recognise two suitable groups—Herakles with the hydra, and Bellerophon with the Chimæra. They then advance up the steps of the temple, and admire the frieze with its Gigantomachia, picking out certain groups of combatants for admiration. Having done this, the chorus finds itself at the door of the temple, and asks about admission. On this part of the subject Prof. Middleton's paper, as read at the Hellenic Society on Monday, did not enter. Possibly it lay outside his scheme. But we venture to recommend to his notice a fresh examination of the text of Euripides, to see whether the traditional opinion as to metopes is tenable or not.

It is assumed that the temple which was standing in the time of Pausanias was the temple built by the Corinthian architect

Spintharos. It would be in every way satisfactory to recover the details of it. But it would be still more satisfactory if excavations should reveal at Delphi, as at Eleusis, something of the various temples that preceded the building of Spintharos. Traces of the previous temple by the half-legendary Trophonios and Agamedes would be a surprise, and what should we not say if evidence could be obtained to clear up in some way the impossible tale of a yet older temple built of wings and wax, or the still older, but more intelligible, temple in the shape of a wooden hut? Funeral vases in the shape of a hut, *tugurium*, and of the most primitive fabric, have been found under the lava at Albano, and it is not at all unlikely that a primitive temple would take that form.

NOTES.

IT is exasperating, and even alarming, to note the frequency of cases in which the communication cord on railways "fails to act." The latest case of this kind occurred on the 18th inst. on the Midland Railway. It appears that a party of domestic servants travelling from Scotland to London occupied two adjoining compartments in the night express, and shortly after leaving Leicester a footman named Foster, while leaning out of the window in an endeavour to attract the attention of the occupants of the next compartment, caught his head against a bridge and was instantly killed. Of course, his fellow-passengers immediately endeavoured to have the train stopped, but without success; and it was actually nearly three-quarters of an hour before they could attract attention. The Midland guards cannot see along the train (as they can on some lines) without putting their heads out of the window, and consequently the train passed station after station unchecked, eventually stopping just beyond St. Albans. A theory has been put forward to account for the failure of the communication,—satisfactory enough, perhaps, to the official mind,—for it was asserted at the inquest that the apparatus was in "perfect working order." But no explanation whatever will be regarded as satisfactory by the travelling public. It was useless to tell the terrified occupants of the compartment that they should have pulled the cord towards them from the rear of the train instead of trying to attract the driver by pulling at his end. Who notices whether the carriage he travels in is nearer to the guard than to the driver? Who, in a crisis like this, would imagine that such calculations would enter into the simple question of stopping the train? Why should it be necessary to pull away at the cord as if engaged in hauling up an anchor? For we may be certain that in this case it would be tugged vigorously enough—indeed, one of the witnesses stated that they pulled it six or seven times, but this does not appear to have been sufficient. We do not willingly find fault with the Midland Railway Company, for they are unquestionably far in advance of some of their fellows in studying the comfort and safety of their passengers; but a reform is loudly called for here. Communication with the officials being only necessary under very exceptional circumstances, railway passengers should be able to ensure it without a shadow of doubt as to the efficiency of the means provided. These should be perfectly simple. It is, moreover, extremely desirable that the system of communication adopted should be uniform on all our lines.

THE Glasgow Exhibition will close on the 10th prox. The turnstiles already record the large number of five millions of visitors, and it is believed that there will be a very large money surplus. Naturally enough, there are many aspiring projects whose friends are putting in their claims to this surplus, or a portion thereof. A technical college, a musical college, the Mitchell Library, Fine Art Galleries, and the Glasgow School of Art and Haldane Academy are among the numerous claimants. While hoping that the surplus will be large enough to give substantial aid to all these institutions, we wish to cordially endorse and support the suggestion made by Mr. David Thomson, the President of the Glasgow Institute of Architects, in his address to that body the other day, as mentioned in another column. Mr. Thomson suggested that the Glasgow Institute should approach the Executive Committee of the Exhibition, to urge upon them the desirability of spending 5,000*l.* or 10,000*l.* of the surplus (if so much could be afforded) in founding a Chair of Architecture in the University. In Mr. Thomson's words, "it would be one of the most suitable, one of the most satisfactory, and one of the most praiseworthy acts that could be done, and a very proper and suitable mode in which a part of the surplus, at least, might be expended."

A NEW edition of the list of members of The Institution of Civil Engineers has just been issued, from which it appears that there are now on the books 5,529 members of all classes, as against 5,328 twelve months ago. The present total is made up as follows:—Honorary Members, 19; Members, 1,614; Associate-Members, 2,499; Associates, 458; Students, 939 (these figures are corrected to October 1). As will be seen, there is a considerable class of "Student"-members, who hold periodical meetings of their own, and read and discuss papers amongst themselves, under the chairmanship of senior members of the Institution. These meetings of "Students" are, we hear, becoming increasingly useful and helpful to those who take part in them, and they are altogether supplementary to the meetings of the senior members of the body, which are held *weekly* during the session. The list of meetings of the institution for Session 1888–89 is now before us. From it we learn that between November 13 next and May 21, 1889, there will be twenty-five ordinary meetings and twelve Students' meetings—a very good programme. The Institution is to be congratulated, not merely on its prosperity, but on its capacity for work.

WE hear that Miss Harrison, whose lectures on Greek archæology at the British Museum and at South Kensington have been so successful, is one of the candidates for the vacant Chair of Greek Archæology at University College, London.

DR. H. BRUNN'S great work on the "Griechische Künstler" appeared in 1857. It has ever since been the standard book of reference, and a work, we may say, as remarkable for its almost prophetic insight as for its careful and laborious accumulation of detail. It has been out of print many years, and second-hand copies have of late been eagerly sought for. A second edition is at last announced. The first "lieferung" has no doubt been eagerly cut open by many an archæologist, only to be closed with bitter disappointment. The new edition is—so far as can be judged from this first number—merely a reprint. The notable discoveries of the last fifty years are, it seems, to be wholly ignored—Delos, Olympia, the Acropolis of Athens, are as if they were not. We naturally turned at once to the earliest school of marble sculptors, the "family of Melas at Chios" (p. 29). There, after due citation of Pliny and the scholiast on Aristophanes, we are amazed to read "Melas and Mikkiades are known only by this single mention in Pliny (Melas und Mikkiades sind uns durch diese einzige Erwähnung des Plinius bekannt)." This is enough—we most frankly own we read not a single word further. Let those who possess the first edition stick to it, and not go to the expense of the second. The best supplement to the old book is not the new reprint, which has nothing to recommend it but better print and a rather bigger page, but Loewy's admirable "Inschriften der Grieschischen Bildhauer." We can well understand that Dr. Brunn, at his advanced age, with his heavy professional duties, could not undertake a second revised edition; the first is his life-monument. But where are his pupils?—a band whose devotion is known through all Europe.

THE carved red lion until lately in Holywell-street, Strand, to which we briefly referred last week, was generally believed to be associated with the once neighbouring Lyon's Inn. It was fixed at the end of the narrow passage which, by the side of the old house, No. 36, with gilded sign of the Crescent Moon, leads into the Strand. Lyon's Inn was demolished about twenty-two years ago. The Globe and Opera Comique Theatres, between Holywell and Wych-streets, stand over its site. In the Inn hall the Architectural Association, founded in 1842, used to meet until, we think, 1859. Ordinary guide-books quote Sir George Buc (in Howes' "Annals," 1631) to the effect that a hostelry here, by sign of the Lion, was bought *temp.* Henry VIII. by some lawyers, and converted into an Inn of Chancery. But in W. Herbert's "Antiquities of the Inns of Court and Chancery" (1804) reference is made to the steward's old books of account, which contain entries made *temp.* Henry V., and Herbert adds, "How long before that period it was an Inn of Chancery is uncertain." The government of the Inn, annexed to the Inner Temple, was vested in a treasurer and twelve ancients. Here, in 1578, Sir Edward Coke was Reader. He had been admitted of Clifford's Inn 1571. The one small court—planted with trees, and with one entrance from Holywell-street, and another out of Newcastle-street, *olim* Magpie-alley—had chambers to north and east. In the south-western corner, abutting on the rear of Holywell-street, stood the hall, of date 1700, its front elevation surmounted by a pediment bearing the carved sign of a lion rampant. Of late years the Inn acquired an unenviable notoriety, especially as the residence of Weare, the professed gambler, whom John Thurtell, starting with him in the gig,—emblem of respectability,—decoyed out of town, and murdered close by Probert's cottage in Gill's Hill-lane, near to Radlett, Hertfordshire.* The cottage by the pond, visited by Sir Walter Scott on May 28, 1828, was dismantled in November, 1884. Thurtell was a carpenter in his way, and designed the scaffold, now preserved at "Madame Tussaud's," whereon he was executed,—through his accomplice's evidence,—on January 9, 1824. We hear that two other relics of Old London are about to be removed to the Guildhall Museum. These are C. G. Cibber's recumbent figures of Raving and Melancholy Madness, which formerly rested on the gates of Bethlehem Hospital in Moorfields,—εικονα των εντος χὼ λιθος εκτος εχει,—and for some while past have been lodged in the South Kensington Museum. We gave a few particulars about them and the hospital of St. Mary of Bethlehem in our columns of June 4 last year.

FOR some time past French art has been suffering heavy losses. But lately there disappeared from the Académie des Beaux Arts Gustave Boulanger, one of the most authoritative representatives of Classic art, and now landscape and the new school of sculpture lose each an artist of very real and much-appreciated merit: the sculptor Longepied and the painter Feyen Perrin. The death of Longepied is a great loss for modern art, for, though scarcely thirty-nine years old, he has left us some remarkable works, that place him in the first rank among artists. After having studied successively under MM. Cavelier and Mathurin Moreau, he became the pupil and inseparable friend of Coutæ, with whom he worked upon the monumental fountain which is to decorate the park of the Exposition Universelle in the Champ de Mars. The marble statue of the "Fisherman drawing up the head of Orpheus in his nets," which decorates the lawns of the Ranelagh and belongs to the City of Paris, gained him, in 1880, a medal of the third class. In 1882, he

* This gig and the roan horse were exhibited, during the trial, at the Surrey Theatre.

obtained, with the model of his magnificent group "Immortality," a first medal and the Prix du Salon. The same group, executed in marble and exhibited in the Salon in 1886, is now in the Luxembourg. An illustration of it has appeared in the *Builder*. Finally, last year, upon the inauguration of the monument raised at Provins to the heroes of the National Defence, the Government decreed him the Cross of the Legion of Honour. Among his works must be mentioned, also, the charming bust of Mdlle. Bashkirtseff, the young Russian artist who died also so prematurely, some years ago, that of Madame Berraicea, exhibited in the last Salon, the statue of Ledru Rollin which decorates the Hôtel de Ville, and that of Danton, erected about two months ago at Arcis-sur-Aube. Longepied's death occurred while he was preparing a very considerable work for the Exhibition of 1889, and is, as we said, a very serious loss for French art. He was in all the vigour and exuberance of life, and to him apply the beautiful verses that he caused to be engraved on his group of "Immortality":—

"Hereux l'élu des Dieux qui nous quitte avant l'heure,
S'il te voit près de lui, sainte Immortalité,
D'un sublime baiser si ta lèvre l'effleure,
Et s'il va, dans tes bras, à la Postérité."

THE obsequies of the painter Feyen Perrin took place on the same day, and even at the same hour at which Longepied was carried to his last resting-place. He was born at Nancy in 1829, and after having studied under MM. Léon Cogniet and Yvon, in 1848 entered the École des Beaux Arts. He gained medals in the Salons of 1865, 1867, and 1874, and in 1878 obtained the Cross of the Legion of Honour. His speciality was sea-pictures, and his studies of the fisher-folk of the Normandy and Brittany coasts have a well-merited reputation. The Museum of the Luxembourg possesses an excellent picture by this artist, called "Return from the Oyster-fishing during the Spring Tides at Cancale." Feyen Perrin was a conscientious painter, with a facile and elegant manner. Perhaps he may be reproached with having idealised a little too much the type of his figures, which have not that native ruggedness inherent in persons whose life is so laborious, but his canvases are full of poetry and of fine and well-blended colour. Though suffering for many years from an incurable disease, the courageous artist has never ceased to take part in the annual exhibitions, and in the last Salon was represented by two pretty little pictures—"Une faveuse" and "L'étroit sentier." M. Feyen Perrin was to have carried out an important piece of decoration in the salons of the new Hotel de Ville.

THE walls of the Fine Art Society's Gallery are once more covered with a collection of water-colour drawings "by various artists." Considering that most of the contributors are artists of name, and that a considerable majority of them are members of either the Society or the Institute, the average quality of the work might have been higher than it is; perhaps the wet summer is partly accountable. However, there is plenty to attract visitors to the gallery, and first, in the order of the catalogue, come two bright drawings of blue water and boats, by Mr. W. L. Wyllie, and a sketch, No. 21, by Mr. Henry Moore, A.R.A., not much more than a rough note of the colours of sea and sky on "A Silvery Morning," but with plenty of vigour and a fine sense of colour. Mr. Wilfred Ball's little sketch, "Afternoon Sunshine," will probably attract attention, and so will Mr. Herbert Marshall's "Haarlem," a beautifully-drawn and coloured sketch of picturesque buildings, with some equally picturesque little figures in the foreground, so placed as to complete the composition in a very neat and masterly manner. Mr. Walter Crane's "Diver" is an odd and not very attractive work; but Mr. Arthur Severn's "Rainbow at Sea" is a fair specimen of his always enjoyable pictures. Mr. Hugh Carter's "Scenes from Dutch Life," No. 59, are strong, but not so strong as Mr. Marshall's "Hoorn," No. 65. Among others, Mr. J. MacWhirter and Mr. C. E. Johnson send good work; and among the contributions of still-life studies Mrs. Cecil Lawson's are conspicuous.

AN exhibition of drawings and sketches of "Our Country and our Country-folk" has been opened this week at Messrs. Dowdeswells. The highly-finished and, for the most part, bright and pretty little water-colours that make the bulk of the collection are all the work of Mr. Arthur Hopkins and Mr. C. Robertson, two members of the Royal Society of Painters in Water-Colours. Most of Mr. Robertson's works are remarkable for the marvellously laborious manner in which they are finished, and for their clearness and sparkling brightness. Water is introduced into a large number, and the figures, where any appear, are usually anglers or fishermen. One of the best is No. 71—a sketch at Guildford of a quiet bit of river running between the old houses, two children angling in the purple shadows on one side, while the sun brightly illumines the other. There is a contrast of bright sunshine and shadow in this picture which is very pleasant. So also is a somewhat similar contrast in No. 38, "Passing Showers," in which a stretch of sandy common is shown, with trees and a few red-roofed cottages in the background, all in the shadow of the clouds, except where a gleam of sunshine illumines a patch of yellow sand. Mr. Hopkins's work is rather unequal; "A Shrimper," No. 8, a sketch of purple evening shadows on sky and sea, with the solitary figure of the shrimper as the only solid object in the landscape, is strong; and so is No. 28, a somewhat similar subject, in which a single figure stands out against a background of sea and sky. No 64, too, a sketch at Robin Hood's Bay, is very good indeed; but there are others that lack much interest of any sort.

IT has not frequently happened that a lady has been commissioned to paint the panels of a reredos—at least directly; but the design of Miss Dora Noyes was lately chosen from among those submitted for the decoration of the reredos of St. Luke's, Uxbridge-road, and has been very successfully carried out. The end of the church is covered with conventional cusped panelling, and the problem before the artist was made considerably more difficult by the extreme narrowness of the middle panel. This has been successfully overcome by placing the lamb in glory in the narrow panel, while a crowd of cherubim, seraphim, and the heavenly host occupy the larger panels at the sides. The whole is very decoratively treated, and Christian symbolism has been carefully studied. At each side of the altar are two large panels, each couple of which has formed the ground for a single picture rather unpleasantly divided down the middle by the mullion. These pictures are very good specimens of religious art, conceived in the right spirit and carried out with considerable technical skill. The subject on one side is the Adoration of the Shepherds, and there is a very pleasant originality in making one of the herds a boy. On the opposite side is the Way of the Cross, and it says everything for the feeling of the artist that one can look at such a picture and feel there is no such jarring note as is almost always to be found in modern religious works.

EXHIBITION OF PASTELS AT THE GROSVENOR GALLERY.

IT is to be hoped that the exhibition of pastel drawings at the Grosvenor Gallery will really prepare the way for a revival of so charming a method of artistic expression in this country. The work of some of the French exhibitors points clearly to the conclusion that, for portraiture at any rate, there is little that is beyond the powers of the medium in the hands of a master of it; while the exhibits of others as clearly show how exactly it is adapted to that class of studies which are more than sketches and less than pictures. Such studies as frequently show the individuality of the artist more forcibly, and his ideas more freshly, than his finished works, and are not unjustly sometimes valued as highly. If it is true that a "fixatif" has been invented which will prevent the pastel from rubbing, without destroying its surface or affecting in any way the colours, then the greatest objection to the use of the medium has been removed, and with the improvements that have been introduced in the pigments, coupled with the comparative cheapness of production, it will be surprising if pastel drawings do not become popular with both artists and the public.

One of the first things that strikes a visitor to the Grosvenor is the marvellously skilful handling of some of the members of the Société de Pastellistes Français. Most of the English exhibitors have either fallen into hardness, or have become smudgy or misty, and have failed, either through lack of skill or because they have not thought it worth while, to obtain anything in the shape of surface or texture. But to the more practised French artists no such difficulties seem to present themselves,—or, possibly, a better knowledge of the material and the limits of its powers has saved them from often making attempts likely to end in failure. The portraits of M. J. E Blanche are the works in which this skill in technique, combined with higher artistic powers, is most conspicuous, and he hardly needed the aid of such charming subjects to recommend his work to the English public. In the "Portrait of Mdlle. J. M." alone has he at all approached failure, while his portraits of Mdlle. Bartet, of the Comédie Française, and of the Donna Olga Carraciolo, are quite unqualified successes, beyond which it would seem impossible to go. Mdlle. Bartet, a very pretty, quiet-looking woman, is seated, dressed in a loose, black evening dress of soft material, which falls, or is drawn, into the pleasantest folds, and contrasts charmingly with her white feather cloak, the drawing of which is quite wonderful. The other picture shows a pretty child in a red dress and spotted pinafore, standing against a light curtain, smiling and very graceful. M. J. L. Machard and M. Roll display in their contributions almost equal skill, but their nude figures, however perfect from the artist's point of view, are not of a class to appeal to the English public as a whole; M. Machard exhibits, indeed, some portraits, the handling of which is masterly, but they lack the refinement of M. Blanche's work. The portraits of M. Émile Lévy, especially his "Mdme. D.," No. 249, and of M. G. Dubufe, will be studied with interest, as will the work of M. P. A. Besnard, especially his portrait No. 152. The boldly-drawn studies of M. P. Helleu must command the admiration of all by their breadth and freedom, and to a certain school his work No. 148 will appeal with especial power. M. Hubert Vos, who is becoming a power in London among a number of young artists, contributes several otherwise excellent works, some of which betray a peculiarly sympathetic nature, but which we consider are spoilt by an all-pervading, but apparently intentional, mistiness.

Among the English contributors, Mr. W. E. F. Britten's crisp and beautiful studies, somewhat in the manner of the old Italian masters, are most conspicuous. This artist exhibits a large number of such studies, most of them small in scale, but all alike displaying their author's wonderful command of line-drawing and spirited design. It will suffice to mention "The Ace of Hearts," No. 266, and the figures of dancers, Nos. 218 and 219, lent by Mr. Geo. Aitchison, A.R.A. Mr. Solomon J. Solomon's "Miss Ethel Wright" is the most ambitious of the English portraits, and has obtained a place of honour; it is a striking work, but the artist has failed in the tints and texture of the flesh, especially as regards the right arm. Mr. Walter Langley's "Cornish Fishwife," No. 86, is an exceedingly successful study in cool, soft tones, well drawn and well composed. Mr. Yeames's "En Vivandière" is a charming and spirited picture, and Mrs. Louise Jopling's portraits claim a word of praise; Mr. J. J. Shannon, too, contributes two charming studies of heads.

Among the landscapes, Mr. Arthur Severn's pictures from the Somme, and Mr. J. Aumonier's "On the South Downs," are among the most successful; while the unfinished studies of Mr. William Stott, of Oldham, appear much less affected when the medium is pastel than when it is oil. Mr. Whistler's sketches in Venice will, of course, be studied

with interest, and so will the portrait by Mr. Holman Hunt, drawn in red and black, in the manner of the pastels which were once a popular form of artistic expression. The powers of the medium have been greatly enlarged, and it yet remains to be seen whether, in English hands, it may not be as successfully used for landscape as it is by our neighbours for portraiture.

THE TEMPLE OF APOLLO AT DELPHI.

The Society for the Promotion of Hellenic Studies held its first general meeting for session 1888-9 on Monday afternoon last, at 22, Albemarle-street, Mr. Sidney Colvin, Vice-President, in the chair.

A long and interesting paper on "The Temple at Delphi," by Professor Middleton, was read by Mr. George A. Macmillan, the Hon. Sec. (in the absence, through illness, of the author).

After some introductory remarks, the author of the paper remarked that now that the long-expected excavations on the site of the Delphian temple were, it was to be hoped, about to begin, it might seem an unfortunate time to deal with the subject; but, in the first place, some of the evidence afforded by the remains which he was able to measure some years ago could hardly be contradicted by future discoveries; and, secondly, it was well before beginning an excavation to seek out from all available sources what records existed about the building, so as to know what to look for, and how to read the lesson taught by even the smallest piece of detail. For that reason he now laid before the Society such literary and other indications as he had been able to collect about the temple, and also a hypothetical restoration of the building, in spite of the probability of its being in some respects confuted by future discoveries. According to the tradition handed down by the Greeks, there were five successive temples built to enshrine the world-famed oracular chasm of Delphi. The first three temples seemed to have belonged to a pre-historic period, earlier than the date of the Homeric poems, and anterior to the introduction into Delphi of the cult of Apollo and other celestial deities. Pausanias gave a list of those five temples, without, however, distinguishing those which were earlier than the Apollo cult. The legend as to the first temple was that it was made from branches of bay; that as to the second temple was that it was built by bees, with bees'-wax and with wings. The third temple (according to the myth quoted by Pausanias (x., 5), was constructed of bronze, by Hephaistos. To show that a bronze building was not an impossibility, Pausanias mentioned Danäe's tower and other buildings, but stated that he did not believe in Hephaistos having been the builder of the third temple. All that he said about the fourth temple was that it was built of stone by Trophonios and Agamedes, and that it was destroyed by fire when Erxicleides was Archon in Athens, in the first year of the 58th Olympiad (548 B.C.). With the founding of the fourth temple we had come to the period of the advent of Apollo to Delphi, as described in the Homeric hymn to the Pythian Apollo, which relates how the deity, after visiting Olympus, journeyed to various places in search of a home, finding none to suit him till he reached the port of Delphi. Landing there, he said: "I will build a splendid temple to be an oracle for men; they will bring hecatombs from Peloponnesus, from Europe, and from the isles; and I will make revelations to them in my temple." Then Phaibos Apollo laid massive foundations, and on them Trophonios and Agamedes, sons of Erginos, laid the stone threshold, and countless crowds of men raised the temple with smoothly-cut blocks of stone. On the destruction of the fourth temple, a meeting of the Amphiktionic Council was held, and it was then decided that a quarter of the cost of the new temple—viz., 75 talents,*—should be borne by the people of Delphi, and that the remainder of the 300 talents needed for the work should be collected as donations from the rest of the civilised world. In few places, according to Herodotus, was so handsome a subscription given as in Egypt, where the Greek colonists of Naukratis and elsewhere subscribed twenty *minæ*, and King Amasis contributed 1,000 talents of alum. The architect selected by the Amphiktions was a Corinthian named Spintharos, a hitherto unknown name (Pausanias, x., 5). The contractors for the new building were, as Herodotos (v., 62) records, some wealthy members of the Alcmæonidæ family, who were then exiles from Athens through the enmity of the Peisistratid Hippias, after the death of the partisans of Kylon. The Alcmæonidæ were not only wealthy, but had been possessed of political influence, partly arising out of their friendship with Crœsus of Lydia,—himself the most munificent of benefactors to the Delphian shrine. According to the contract drawn up between the Amphiktionic Council and their builders, the temple was to be built of local limestone (*πώρινος λίθος*); but, with great liberality, the contractors made the columns of the front of white Parian marble. With the exception of the external sculpture, which we learnt from Pausanias was not finished till the latter half of the fifth century B.C., the building could not have taken many years to complete, considering the enthusiasm of the contractors and the ample supply of money which poured in from so many sources. In all probability the temple was fit for use before the end of the sixth century B.C. Pindar, writing about 490 B.C., spoke of it as if it were not in an unfinished state. Its beauty was celebrated by Euripides, by whom the two sculptured pediments were specially mentioned. Spintharos's temple was, as might be expected from its date, a Doric hexastyle peripteral building, with sculpture in both pediments and in some of the metopes.

Having discussed the sculpture and other details of the building by the light of information gleaned from ancient sources, Professor Middleton dealt with the few existing remains of the temple. He said that as far as we knew it, the Doric architecture of the Greeks in the sixth and fifth centuries B.C. was designed with a certain uniformity of detail which enabled one, from a comparatively small part, to reconstruct the whole with great probability of being not very far from the mark. Given that we had to deal with a hexastyle peripteral Doric temple designed by a Corinthian (Spintharos) in the latter half of the sixth century B.C., the first question to ask would be, What was the diameter and the intercolumniation of the columns of the Order? Luckily there was evidence of this. In 1875 the author was able to find and to measure thirty-two drums of Doric columns made of the rough siliceous limestone from the quarries of Mount Parnassus, and still in part retaining their coating of very hard, fine stucco, made of lime and powdered white marble, which appeared always to have been used by the Greeks to coat temples which were not built of real marble. That beautiful substance was quite unlike anything which we now called stucco. It was as hard and durable as real marble, and took by polishing the same delicate, ivory-like surface as the best Pentelic marble. Moreover, it had the advantage over real marble of affording a slightly absorbent ground for coloured decoration. These column-drums naturally varied in size, owing to the diminution of the shaft; the largest measured (including the stucco) close upon 5 ft. 9 in. in diameter, thus giving the size of the column at the bottom. The top diameter, 4 ft. 2½ in., was given by the necking of the capitals, of which a few examples were still to be seen. As none of the drums of the columns were still *in situ*, the only way to discover their intercolumniation would be to make out the length of the architrave blocks. After long search the author found one of these blocks* which had its ends sufficiently perfect to give the complete length; this was 13 ft. 3 in., giving such an intercolumnar space as might be expected from the analogy of other Doric temples, namely, 7 ft. 6 in. clear between the bottoms of the shafts.† The drums of the shafts had twenty flutes, like those at Ægina, the older and the present Parthenon, and other Doric temples of about the same period. Their average thickness was about 2 ft. 6 in. These data enabled one to set out the fronts of the temple, allowing a slight additional diameter and closer intercolumniation at the angles, according to the Doric rule. Thus the author, in his restoration of the temple (of which he exhibited drawings), had conjecturally made the angle-shafts 6 ft. in diameter, and the intercolumniation 7 ft. 4 in. This would give a width of 72 ft. 2 in. for the temple, measuring from the outside of the columns, or about 72 ft. 6 in. on the top step. Comparing this with other hexastyle Doric temples, that at Delphi would range thus:—

Temple in Ægina	45 ft.	0 in.	wide on the top step.	
"Theseum" at Athens..	45	2	"	"
Temple at Bassæ	48	2	"	"
Heraion at Olympia	57	0	"	"
Pre-Persian Parthenon..	66	0	"	"
Temple at Delphi	72	6	"	"
Temple at Corinth.....	73	0	"	"
Great Temple at Pæstum	78	10	"	"
Temple of Zeus at Olympia	90	0	"	"

It might be a coincidence, but if so, it was a remarkable one, that these dimensions of the temple at Delphi worked out so as to give a front almost exactly the same as that of the temple at Corinth,* the Delphian temple being designed by a Corinthian architect. The columns of the temple at Corinth measured 5 ft. 10 in. in lower diameter, as against 5 ft. 9 in. at Delphi; but the intercolumniation at Corinth was (at least on the flanks) closer than in the Delphian temple, as might be expected from its much more archaic style. The number of columns which the author (in his restoration of the temple) had shown on the flanks, and consequently the length of the whole temple, and its sub-divisions into *pronaos*, *cella*, and *adytum*, were purely conjectural. The following table shows the variations in proportional length of the chief hexastyle Doric temples, omitting those of Sicily as being abnormal in many respects:—

The Heraion at Olympia	16	columns on the flanks.	
Temples at Corinth and Bassæ ...	15	"	"
Great Temple at Pæstum.....	14	"	"
So-called "Theseum" in Athens.	13	"	"
Temples in Ægina and at Rhamnus	12	"	"

Thus, with the authority of the temple at Corinth, in order to give ample space for the sanctuary, and also a large *cella* for the inquirers of the Oracle, the author on his plan had conjecturally shown the Delphian temple with fifteen columns on the flanks, thus giving a total length on the top step of about 192 ft. In addition to the large drums of *πώρινος λίθος*, there were about seventeen fragments of smaller Ionic columns of marble, which, as suggested by M. Foucart,† probably stood within the *cella*, as the author had indicated on his plan. Among those fragments were some much-shattered Ionic capitals, which appeared to fit the smaller pieces of shaft. From their fully-developed Ionic style, these could hardly have belonged to Spintharos's original temple, which probably had inner columns of Doric style, as was still to be seen at Pæstum, both in the upper and lower tier. They might, perhaps, be part of the restoration of the temple which was carried out by the Amphiktionic Council after the third Sacred War, *c.* 346 B.C. Stephanus Byz. (*s. v.* Δελφοί) spoke of part of the fourth temple,—that attributed to the mythical sons of Erginos,—as having survived to later times. It seemed quite probable that the stone chamber immediately over the rocky chasm might not have been wholly reconstructed when the fifth temple was built. A partly subterranean stone chamber would probably escape the effects of the fire which destroyed the main part of the temple, and its special sanctity would naturally lead to its being preserved at the rebuilding in the sixth century. Hence in his drawing the author ventured to suggest such a vaulted structure as might naturally have been associated with the names of Agamedes and Trophonios, the builders of the treasury of the Bœotian king,—such a stone vault as we saw in the various so-called treasuries at Mycenæ. Judging from Pausanias's description of the so-called cave of Trophonios, the subterranean oracular cell must have been a vaulted chamber of this description. Passing on to speak of the style of the details of the temple at Delphi, the author said that as the temple was one of which we knew the date from literary sources, it would be interesting to examine the style of the few existing details as a guide to fixing approximately the date of other temples as to which we had no written evidence. The fourth temple at Delphi was, as already mentioned, burnt in 548 B.C., and if we allowed (say) eight years for preparation and collection of money, the last temple would be designed and begun about 540 B.C. The chief archaisms or points in which the earliest Doric temples differed from those of the most perfect

* About 18,000*l.*,—the whole sum being about 72,000*l.*

* Shown to be an architrave block by the traces of the *guttæ* on its upper edge.

† The architrave blocks of the old Parthenon (destroyed by the Persians) which exist built into the Acropolis wall also measure 13 ft. 3 in. in length.

* Dr. Dörpfeld has recently discovered the whole plan of the temple at Corinth, including the foundations of the inner rows of columns in the *cella* and *opisthodomus*. (See *Mittheil. Instit. Athen.* for 1887, Part I.)

† *Mém. sur les Ruines et l'Histoire de Delphes* (Paris, 1865), p. 69.

period,—that subsequent to the Persian invasion,—were these:—

1. Stone wholly used instead of marble, the transitional stage being the use of marble for parts only.
2. The Doric Order used for internal columns, as well as for those of the peristyle and pronaos.
3. Close intercolumniation of the peristyle.
4. Columns (proportionally) short.
5. Monoliths used for the shafts.
6. The diminution of the shaft proportionally great.
7. The architrave deep.
8. The abacus of the capitals shallow and widely-spreading.
9. The echinus of the capitals formed with a more bulging curve.
10. Imperfect use of entasis and the various other optical refinements which existed in the Parthenon and other temples of the best period, as had been most ably shown by Mr. Penrose in his valuable work on "The Principles of Athenian Architecture."

The temple at Corinth gave the strongest examples of all these archaisms. With regard to archaism No. 1, the temple of Apollo at Delphi occupied a transitional position, being partly of marble and partly of local limestone. Other examples of this transition were the temples at Ægina and Bassæ, in which marble was used only for the sculpture and for the roof-tiles. The temple in Ægina and the great temple at Pæstum, both of which came near in date to the Delphian temple, had internal columns in two tiers of the Doric Order, and it appeared probable that this was also the case in the original building of Spintharos, in spite of the existence of the Ionic capitals already mentioned. The discovery of one block of the architrave was but a scanty indication of the intercolumniations at Delphi, as it was very probable that the spacing of the columns on the front was slightly different from that on the flanks. It appeared, however, that the Delphian temple was less pyknostyle than those at Corinth and Pæstum, and more so than that at Ægina.* During the development of the Doric style the columns appeared to have grown steadily more slender in their proportion. Thus those at Corinth were the shortest, being only four diameters, or eight modules, in height; while those of the "Porticus of Philip" at Delos were the longest in proportion of which we had existing examples. The author was not able to discover the height of the Delphian columns with any accuracy, but the proportion seemed to come very near to that at Ægina. As far as they existed, the columns at Corinth, now only seven in number, were wholly monoliths. At Ægina those on the fronts and some of those on the sides were monoliths. At Pæstum, as at Delphi, the shafts were built up of separate drums. The amount of diminution of the Delphian columns at present remained uncertain for want of accurate knowledge of the height, but it was certainly less than that of the columns at Corinth and Pæstum, and probably nearly that of the Æginetan shafts. In the earlier temples, such as those at Corinth and Ægina, the architrave was deeper than the top diameter of the column. In later examples it was less, as, *e.g.*, in the "Theseum," the Parthenon, and the temple at Bassæ. The Delphian architrave occupied an intermediate position, being about equal in depth to the top diameter of the shaft. In most of the earliest temples the abacus of the capitals was shallower than the echinus, the reverse being the case in late examples. Thus, Corinth and Ægina had the shallow abacus; while the "Theseum," the Parthenon, and the temple at Bassæ had the deep abacus. At Pæstum, however, in spite of the early date of the temple and its many archaic peculiarities, the capitals had the deep abacus. As a rule, the earlier the temple and the shallower the abacus, the more widely did it spread, and in this respect Pæstum followed the early rule. The Delphian capital, on the other hand, agreed with the later group of temples, and had an abacus of greater depth than the echinus, with a moderate spread or projection beyond the line of the shaft. So, also, the curve of the Delphian echinus was very unlike the bulging parabola of Corinth and Pæstum, and was even flatter than that of Ægina, being very similar to the echinus of the "Theseum" at Athens. Owing to the present scantiness of the remains, it was impossible to discover to what extent the Delphian temples possessed the various optical corrections which, to a greater or lesser extent, appeared to have existed in all known Greek temples. The remaining points to notice about the Delphian capital were that it had four hypotrachelia at the necking, shaped very much like those at Corinth, Pæstum, and also in some later temples. At Corinth the capitals differed in having only three hypotrachelia, four being more common, though not universal, in the later buildings: the Parthenon, *e.g.*, had five. The annulet below the necking at Delphi consisted of one single square sinking, thus, ⌐¬, as in the "Theseum," the Parthenon, and many other examples. Other temples, such as those at Pæstum, Ægina, and Bassæ, had three annulets, each formed by a triangular-shaped nick, thus, ⊱. The original object of this annulet appeared to have been to hide the bed where the capital rested upon the top of the shaft, and also to prevent "flushing" or chipping of the sharp arrises at the edges. The result of this comparison of the details of the temple of Delphi,—the date of which we could fix as being between about 540 and 530 B.C.,—with those of other temples which most resembled it, but of which we had no written records, would be something of this kind: The Temple at Corinth must clearly be given a much earlier date, probably a full century before that at Delphi, owing to its far more distinctly marked archaisms. It had, in fact, always been recognised as the oldest example of the Doric style which now existed in the mainland of Greece. The temple at Ægina was in several respects distinctly more archaic in its details than the temple at Delphi, and thus it would appear probable that the building itself must be some half-century or more older than its pedimental sculpture, which could hardly be dated much before the year 500 B.C. at the earliest. Though it was to be feared that future excavations at Delphi would not bring to light much of the main temple, yet there was every reason to hope that a great part, if not the whole, of the great stylobate or platform on which the temple stood might be discovered, as it was below the present level of the soil. At the time of the author's visits to Delphi the site was so encumbered by the village huts of Kastri that it was impossible to make any serious search. The temple appeared to have been built on a great platform constructed over a gentle slope inclining down from north to south. On three sides, east, west, and south, this platform was bounded by a massive retaining wall, and within the space thus enclosed the raised paving was, in part at least, supported by rows of small stone chambers in place of solid masonry. The *temenos* in which the temple stood was enclosed by a massive wall of polygonal masonry, which was one of the most interesting relics of Greek workmanship. The masonry was of the most extraordinary kind,—not to be seen anywhere out of Delphi. The polygonal blocks, which measured in some cases as much as 7 ft. across, had their joints worked and fitted with complete accuracy, and their exposed faces dressed to an absolutely smooth surface. But the extraordinary point about the masonry was that many of the joints followed a curved instead of a straight line, involving a most exceptional amount both of skill and careful patience on the part of the Delphian masons, who had made the various curves fit each other with perfect accuracy. Some of the beds, which ranged in a horizontal direction, formed very complex undulating lines. In spite of the use of polygonal blocks, the wall was evidently not one of an early period, but obviously belonged to a time of the greatest possible skill in masonry. The mere use of polygonal masonry was, by itself, no proof of great antiquity, and there seemed no reason to date the temenos wall at Delphi earlier than the rebuilding by Spintharos in the second half of the sixth century. On the south side not less than 300 ft. of this wall still existed in a very perfect state, except that the top rectangular courses had in many places been removed. On this side the average height, when perfect, was nearly 15 ft. The whole visible surface of this extraordinary wall was covered with closely-cut inscriptions, of which there could not be less than a thousand, and possibly many more, dating from the end of the third century B.C. down to the time of Hadrian or later. They consisted largely of decrees of the Amphiktionic Council, granting one or more special privileges to states or individuals.

The discussion which followed the reading of the paper was principally of a literary character, but

Mr. F. C. Penrose stated that he did not consider that the Ionic fragments referred to by Mr. Middleton necessarily belonged to a later date than the rest of the temple, instancing the very early use of Ionic, as evidenced by the recent excavations on the Acropolis at Athens, and referring especially to the archaic Ionic porous stone cap, which he considered belonged to the outer order of the early temple, the foundations of which had been recently laid bare between the Erectheum and the present Parthenon. In reply to a question, Mr. Penrose said that he certainly thought these Ionic fragments might belong to the original design of Spintharos's temple.

Mr. Watkiss Lloyd referred to Ion's description of the sculpture in this temple to be found in Euripides' play; and while he did not anticipate that any portions of it were likely to be found in the course of excavations, he considered that the question of their arrangement formed an interesting subject for study and discussion. He also referred to the statement in one of Pindar's Odes that the Corinthians invented the triangular pediment, which he considered of special interest in connexion with the temple at Delphi, since it was a Corinthian architect who was employed to design it.

Sir Geo. F. Bowen, the Rev. J. Hoskins-Abrahall, Mr. Percival, and Mr. Farnell also took part in the discussion, and a vote of thanks was passed to Professor Middleton for his paper.

THE ARCHITECTURAL ASSOCIATION:

PRESIDENT'S ADDRESS.

THE opening meeting of the session for 1888-89 took place on Friday, the 19th inst., in the meeting-room of the Royal Institute of British Architects, the President in the chair. There was a large attendance of the members.

No fewer than seventy-five new members were nominated for election, and Mr. Hippolyte Blanc, of Edinburgh, was elected unanimously by acclamation.

Mr. Cole A. Adams, in moving the adoption of the report and accounts, which will be found in the "Brown Brook," referred to the satisfactory increase in the number of the members, and to the usefulness of the new Classes. He regretted, however, that so small a percentage of the members attended the Classes, and trusted that, as time went on, the numbers would be largely augmented. The *A. A. Notes* were not so useful as they would be if there was more co-operation on the part of the members. Mr. Appleton had done much for the *A. A. Notes*.

Mr. S. Flint Clarkson seconded the motion, which was put, and carried unanimously.

The Hon. Librarian announced several gifts to the library, and votes of thanks were passed to the several donors.

The prizes were then presented by the President to the successful competitors. We published a list of these a fortnight ago (see p. 270 *ante*).

Mr. Herbert D. Appleton, F.R.I.B.A., President, then delivered the following address:—

That the Association has become in reality "The College of Architecture," affording the best preparation for the candidates for the Institute Obligatory Examination, I think cannot be denied; and with this important object only in view it has a great future before it. But looking to the terms in which the founders of our society defined its objects, namely, "to afford facilities for the study of Civil Architecture," "to advance the profession," "to serve as a medium of friendly communication between the members and others interested in the progress of the art," it seems to me that there are other subjects besides the Examination which claim our attention; and with this in view, I propose to consider one or two suggestions for increasing the scope of our work.

With the present method of carrying on our work by means of honorary instructors, we can still include many studies which are not at present taken up; but I am well aware that the system has very definite limits and possibilities.

* The author, in a foot-note, says: "It may be noted that Vitruvius's remarks on (close) pyknostyle intercolumniation (ii., 3) are not applicable to Greek Doric architecture, about which he is evidently wholly ignorant."

Instruction by Visitors who teach at night what they are practising during the day, and handing on the information they gain, qualified by their experience in its application to actual work, is the most direct method of teaching that can possibly exist. And the sympathy between the Visitors and the students is much greater, and the subjects treated much more practically appreciated than is the case when the instructor is dealing with a subject in which he has not this practical experience in working out the facts or theories that he teaches. It is this feature in our system which is the greatest cause of the success of the Association. The Visitors in most cases, being young practitioners, know the exact points where the students find difficulties, and having only recently acquired their knowledge, often from painful experience, are able to impart a very vital interest to their explanations.

The benefit to the Visitors is equally great, as it stimulates them to qualify themselves for the position they occupy as directors of the studies of the younger members, by thoroughly working up the subjects they undertake. But the number of the older members who act as Visitors must necessarily be small, and I am anxious to see the scope of the Association enlarged so as to bring a great many more of the older men into touch and work with the present working members.

The time has now come, in my opinion, when a new departure should be made in the work of the Architectural Association, by the organisation of a division for the study of modern design. We have in our Classes excellent opportunities for studying the Classical or archæological side of our art; but the modern side is only treated in the Class of Design, and I think that, taking the ages of the members of this Class, it will be found that they are a younger set of men than used to form the Class, say ten or fifteen years ago, and I am afraid that it would be difficult to make the Class work if any large influx of older men joined.

But as each year the tendency of modern design is to free itself more and more from the fetters of precedent, which used formerly to bind it down to rigid accuracy, surely it is impossible to ignore altogether in the working of this Association the influence that contemporary work has on modern design.

As far as the prize-list is concerned, the Association offers no encouragement for the study of contemporary design, but rigidly draws the line at the eighteenth century. No prize, as far as my memory serves me, has ever been offered by the Association for the study of any building of a later period. In this I think that the Association is quite right, and if it were proposed to substitute the study of modern instances for the study of old examples, I am quite certain it would be a mistake. A careful training in the purer styles of Classic and Gothic must in all cases be undertaken in order to train the eye to their just proportions, and to appreciate the beauty and appropriateness of their mouldings and features. And the only way in which this can be satisfactorily done is by carefully measuring and plotting and sketching the actual examples of old work. In fact, without the study of old examples, half our interest in the good modern work of our best architects would be lost, because it is only through our knowledge of old work that we can appreciate the excellence of the rendering of the styles in which they work, and the wonderful manner in which they succeed in catching the spirit of it,—that spirit that gives their work most of its charm. This is the way, and the only way, a student can start on his studies. And therefore I think the Association rightly limits the period of the buildings to be studied by her Travelling Students to those erected prior to the eighteenth century.

But still we cannot shut our eyes to the fact that the precedents for design are sought in contemporary work, and, whether we like it or not, the practice is on the increase, owing, in a great measure, to the number of illustrations that are published. And this being so, it becomes a question whether we should not honestly admit the fact and do our best to train our powers of analysis and criticism so that the selection shall at least be of the best examples. It would not be difficult with many a modern design by our best architects to produce the old examples on which they were based. A careful comparison of the original with the translation would show how much the master mind had used of the original, and how much was his own: and the process of analysis could go further: the translation might be from an original stone or brick treatment into terra-cotta, and to trace how the master had handled the detail so as to suit the new material, and stamp at the same time his own personality on the work, would be most excellent study; or, in other ways, how the nineteenth century requirements were made to modify the original expression. It might, then, be a useful exercise for us to take the old example and try our 'prentice hands at a similar translation. I think, then, we should all acknowledge that the experience gained by the study of how a master workman had handled the subject before us would be of the greatest use in our own attempt. What we want is a careful training in analysis, so that we can learn to know what is good and what is bad in modern design. Then the visits made to modern buildings would be greatly increased in instruction and interest. But this power of discrimination can only be the result of careful training, and students should certainly not attempt to study modern work until they have gone through a proper elementary course in the purer styles. I am anxious not to be misunderstood. I do not for a moment propose the study of modern work for our younger students, or to in any way take the place of a careful study of old work by measurement, or sketching, or the study of all the valuable literature connected with old examples. But what I do lay stress on is that the work that is going on around us, and which is so abundantly illustrated, cannot fail to have a vast influence on our own work. We have here principles of design and pleasing forms of art all ready to our hand, and we should be more than human if we were in all cases able to resist the temptation to taste and handle the forbidden fruit.

It is in order to settle the proper position which the study of contemporary work should occupy in the education of our young practitioners that I venture to make the following suggestion, namely, to form a modern side in the Association which shall be for those members who have passed through the present more or less archæological studies; and the first step that should be taken for the formation of this should be the institution of a common room, open every evening, where all the members might come in contact—the young students using it for a waiting-room till their classes were held, and the men of the modern division for those interchanges of views on professional topics commonly called "talking shop." It should be with a view of talking shop that they should congregate.

Without having any formal papers read or forms of discussion, certain evenings might be set apart for talking over subjects previously agreed upon, such as, for instance, one evening a month might be devoted to discussing the illustrations published in the professional press. But I am anxious to avoid formulating any programme, because I want this to be a common room and nothing more, where a member might be sure of finding another member willing,—aye, more than willing, eager,—to talk shop. I'm a great believer in talking shop, circumstance and place being appropriate. Then, in connexion with this modern division, we ought to have an annual exhibition of illustrations of buildings actually erected, not only in the United Kingdom, but all over the world. This would not be difficult if photographs had, as I venture to suggest they should, a prominent position; but these photographs should be accompanied in all cases by sufficient working drawings to thoroughly explain the principles of design in the buildings. These illustrations should be arranged in such a manner as to contrast the buildings designed for similar purposes, and in such order that they may be intelligently studied and compared with one another. This exhibition could, I think, without very great difficulty, be made a much more complete exponent of our modern art than the Architectural Room at the Royal Academy at present is.

The object of this collection, as I would suggest, should be to show the profession what is being done at the present time, year by year, to meet the architectural requirements of the age. It may be urged that the professional press does this sufficiently fully to obviate the necessity of a special exhibition. I am perfectly ready to acknowledge the wonderful profusion and beauty of their illustrations, and, for the purposes for which I propose this exhibition, the mere arranging of these illustrations in due order would go far to meet the purposes for which I suggest it. The Royal Institute would, I venture to hope, co-operate with the Association to make this exhibition as comprehensive as possible. Whether the public would be induced to take an interest in it or not, I think, is of little consequence; I only propose it as an instruction to the profession; but with the increased interest that is being taken in architectural matters, I think it not at all unlikely that the public would in time be found to take it up. During the exhibition each section should form the subject of one evening's discussion, and, if possible, not only the designs, but the material and points in the construction, should be taken into consideration. Again, the designs submitted for the great public competitions, such as the Admiralty and War Offices, the Liverpool Cathedral, and the Imperial Institute, should each in turn also form the subject of discussion in this common room; difficulties in points of practice met with by any of the members could well be discussed, and good advice obtained; in short, everything of interest to the profession should be considered at one time or another by these "friends in council." By this means I should hope to form a definite professional opinion on the actual work that is being done, which may have an influence on the work of the individual member. This modern division should also form an excellent opportunity for those of our members who have passed the age when they can readily avail themselves of the classes, but who are anxious to prepare for the Obligatory Examination. This could be easily done by the formation of reading parties, in which a definite course of preparation for the Examination could be arranged, which might include time sketch designing as a practice for the design day in the examination.

Ours is essentially a students' society, and the whole of the work (or nearly so) now done in it is for the benefit of those who are preparing themselves for independent practice; but I contend that the objects of this Association are by no means limited to this, and I believe that the free expression of opinion on questions of design and construction would be of very considerable educational value to everybody concerned. In these latter days, with the increased liberty in design, there is not a little tendency to licence, and doubtless there would be plenty of doubtful examples for the censors to draw their moral lessons from, and thus curb the ardour of the younger men and lead them in the direction of more consistent styles. And the fact of pointing out these things would, I trust, have an equally good effect on the censors, who might reflect that some of their own work might come under like condemnation. I know of no place where similar opportunities for the exchange of professional opinion can be enjoyed on so large a scale as would be possible if this scheme were carried out; but the general idea has been carried on successfully in several small societies which exist among our members, and I am sanguine enough to hope that it would succeed on the larger scale.

Although the number of old members who continue their subscriptions long after they have ceased to derive any benefit from the Association is a very gratifying feature, it has always been a matter of regret to me that the majority of our members so quickly drop out of touch with the working of it as soon as they have passed through the Classes, and it would be a most important step in advance if those members would revive their interest in the work of the Association. The sacrifice of time need not be very alarming, say one evening a month, and no pledge given, but just to drop in for an hour or two, and in a friendly chat help forward the matter under discussion, or to express an opinion either of commendation or the reverse on what is public property and open for criticism. In this way I feel sure a large amount of good work could be done, and it would be a great help to our younger men to have some guidance in the formation of their opinions on questions of design. And if you had to listen to some crude talk or advanced opinion from the younger men, it would do you but little harm—nay, I make bold to say, it might do you some good. Greater enthusiasm and earnestness of purpose, as far as my experience goes, are rarely to be met with than amongst our members, and the kind attention with which they always receive any endeavour to help them in their work more than repays any trouble it may involve.

But I have dwelt, I am afraid, too much on this attempt to re-introduce an old and most important feature of the Association in its early days, and will now only just refer to our scheme for the affiliation of all the student architectural

societies with our Association, as this subject will have to be brought before another ordinary meeting during this session, in accordance with the rules which were passed a short time ago. I may, however, be allowed to briefly mention the most important features in the scheme. The first is that as, in accordance with the new Charter of the Royal Institute of British Architects, this Association will have a recognised representative on the Council, this affiliation scheme will, if successfully carried out, constitute him the representative of all the architectural student members belonging to the affiliated societies; and in any matters connected with the obligatory Examination it is most important that they should be directly represented on the Council. Secondly, as most of the Classes carried on by these societies are modelled more or less directly on our own classes, valuable exchanges of information and advice can be made. In some cases the Classes, as is now the case with the Birmingham Association, can make arrangements for interworking. And the repetition of some of our courses of lectures to the provincial societies, and the extension of the use of the loan library, are most important benefits that will be derived from the scheme.

With regard to the work of the Association's Classes, some slight alterations have been made in the Elementary Classes of Design which were suggested in the Class reports, and which it is hoped will improve and increase the benefits, already very great, which are to be derived from these Classes.

No alteration will be made in the Class of Design, the result of the working of last session being considered satisfactory. But during the present session an attempt will be made to improve the working of those Classes in which paper work is submitted. Under the present arrangement the Visitors to these Classes have to deal with some thirty to forty papers, each of which consists of from fifteen to twenty pages of foolscap. The mere reading, correcting, and marking of these papers is no slight task, and to attempt to point out to each individual student the errors in his paper at the Class meeting, or to question him as to answers which require explanation on his part, as well as to point out to the Class specimens of the best answers, is almost impossible, and makes the meetings very long, and sometimes slightly tedious. Among the fresh facilities for study, it has been found desirable to start this year a class for the study of natural philosophy, which will form an introductory course to the class of graphic statics. The new course of lectures on geology has a very close connexion with the science of building, and those students who make their first acquaintance with this most fascinating of all the sciences will find in Mr. Locke an able and lucid exponent, while those who already have some knowledge of the subject will, I venture to think, find it treated from a standpoint that probably they have not previously regarded it, and both will, I hope and trust, be led to make practical geology one of their constant pursuits, as the opportunities which they as architects have of following up this study are very great. It is to be hoped that the students this session will not neglect their opportunities as they did last year with regard to joining the Land Surveying Class in sufficient numbers to enable the class to be formed. I would also call the especial attention of the members to the new arrangements for the study of water-colour, which should ensure the success of the Water-Colour Class during the vacation, and I will now conclude with a few remarks to those students who are about to work in the classes.

I take it for granted, gentlemen (and I am sure you do yourselves), that you are all greatly gifted (laughter), and have each and every one a glorious and successful career before you; but of this much I am sure, that the matter is very much in your own hands. Remember that the very magnitude of your talents implies great responsibilities, that genius is said to be only another word for capacity for hard work, and that it is only those who persevere and work to the end who really show and make good use of the talents they possess.

Year by year our Class reports record a falling off in the attendances at the Class meetings towards the end of the session. This can only be attributed to one cause, that the students are disappointed in themselves and find that they are not the geniuses they thought they were, or they would endure to the end. But I hope I am not speaking to any such to-night; and if I am, I would still urge those who feel this disappointment to work steadily on, because you may have been mistaken and find that your talents were hidden treasures, only to be found by painful search. In this Association every one is on a perfect equality, and your position in it will be entirely of your own making, and depend on your abilities and personal qualities, without regard to your rank, position, or money.

In working in the Classes you cultivate habits of self-denial, unselfishness, self-reliance, and industry, which will make your life work easier, and in the end you will find these habits a very good substitute for genius. The prize can only be gained by one; the benefit of working in the Class can be shared by all. By all means strive for the first place, but do not leave off working because you see you have no chance for it.

Cultivate by all possible means the artistic side of the profession, but do not be led into the error of despising the practical and constructive side. If, for instance, you have to leave the writing of your specification to some one else, I am afraid the building will hardly realise your own ideal. No artist was ever spoilt by studying construction, and as facilities are now afforded for you to know the why and wherefore of each formula you use, I would strongly urge you to follow up the study at least so far as to be able to build up some of the simpler formulæ for yourselves.

Take every opportunity the Association affords of making new acquaintances among your fellow students; they may, and often do, ripen into useful and valuable friendships in after years; but my object in this is for present purposes. One of the most important accomplishments in an architect is to be a good judge of character, and in the Association you have as varied a collection of types as you are likely to meet anywhere.

I said at the commencement that our system of instruction had very definite limits and possibilities. The value of receiving tested and approved information is very great, but at the same time it is necessarily condensed and brief. Do not therefore think, when you have listened to all the lectures and passed through all the Classes, that your salad days are ended, and in the ripeness of your powers you are equal to any emergency. The lectures and Classes are at best only hints and outlines that you must fill in for yourselves.

In London the opportunities for doing this are without rival anywhere, and full particulars where these are to be found are set out at the end of the "Brown Book." The Classes are only intended to whet your appetite for more direct and scientific knowledge.

Mr. Aston Webb, in moving a vote of thanks to Mr. Appleton, complimented him on his excellent address, and congratulated him on occupying the Presidential chair of the Association (applause). The members recognised Mr. Appleton first and foremost as an Association man, who had worked all through its Classes, and had done more, perhaps, than any one to advance its usefulness. Therefore they looked upon their new President as the right man in the right place (applause). Moreover, they recognised in Mr. Appleton an architect of ability, and one who had occupied a public post for some time with honour to himself and satisfaction to those who employed him. Besides all this, the members looked upon Mr. Appleton as "a rattling good fellow" (cheers). Within the last year or two Mr. Appleton had started several schemes, all of which had been of the greatest possible advantage to the Association; and now he had sprung another yet upon them. Underlying the chief points of the address was the new scheme, which, doubtless, they would all be prepared to enter into most heartily. Some letters had lately appeared on the matter of plagiarism in architecture, and two gentlemen had got rather warm over discussing whether modern work, or the work of men who had gone, should be considered. One gentleman contended that the South Kensington rule,—"Nothing to be copied until a man is dead,"—was the right one (laughter). That looked all right in the galleries at South Kensington; but he could not himself see why a man's work should necessarily become a special object of study as soon as he, unfortunately, was gone. He preferred Mr. Appleton's suggestion, that they should meet and discuss work actually being done at the present time. The attempt to illustrate architecture by designs had often been tried, and Mr. Appleton had suggested that it should be tried once again. He quite agreed that it would be a most desirable thing to do. The Architectural Exhibition, if not altogether a success, was certainly not a failure, and the Exhibition of Arts and Crafts at the present time seemed very nearly allied to an architectural exhibition. If its scope could be extended a little further, and made to embrace something more of architectural design, it would be an exhibition which, while it gave all the facilities they required, would also interest the public,—a necessity if it was to be anything like a success. As to the question of whether they ought not to copy modern work, or be affected by it, he doubted if there was a man in that room who was in practice, who could lay his hand on his heart and affirm that his work had not been influenced by Mr. Norman Shaw. If there was such a man present, he would be inclined to say it would have been better for him if he had allowed his work to be so influenced (laughter). The great result of any man's work should surely be, not only that he had put up a beautiful building, but that he had influenced and helped others to do so. The chief use of a common-room, such as had been suggested, would be to discuss these matters. If each one could only produce one or two small points of beauty in their designs, it would lead on in time to an architectural style which, he believed, would be worthy of the present century (applause).

Mr. John Slater, B.A., in seconding the motion, remarked that they could hardly have listened to a more practical address, or one better fitted for the members of the Association. Mr. Appleton had certainly hit upon a new means of usefulness for their Association. It was impossible, he believed, to find an architect who, if he had to put up one of his buildings again, would not see where he could alter and improve it in some manner, and it would be most useful to have a common room where he could discuss difficulties with his brethren. The modern ways of building were so different from those adopted by the ancients that it was impossible to go on copying slavishly. It would be an admirable thing if they could have such an exhibition as had been hinted at annually, but he could foresee considerable difficulty in the way. One of the chief styles or methods of building he would like to see year by year exhibited would be those of America, because the leading architects of that country seemed to have cut themselves more adrift from tradition than those of any other nation. The late Mr. H. H. Richardson, for example, was one of the most original architects of this or of any other age, and those who had seen photographs and drawings of his buildings must have been marvellously struck with the innate genius of the man in adapting old forms to new requirements (applause).

Mr. E. J. Tarver said it was often difficult to get people to believe that there was a modern style, though there were hundreds of important buildings which it was a pleasure to look at, and which were obviously the work of the present day. If, then, they could get people to appreciate contemporary architecture,—he would not say exactly to admire it,—they would have struck a nail into the coffin of that sneer they were always met with in speaking about the modern style (applause).

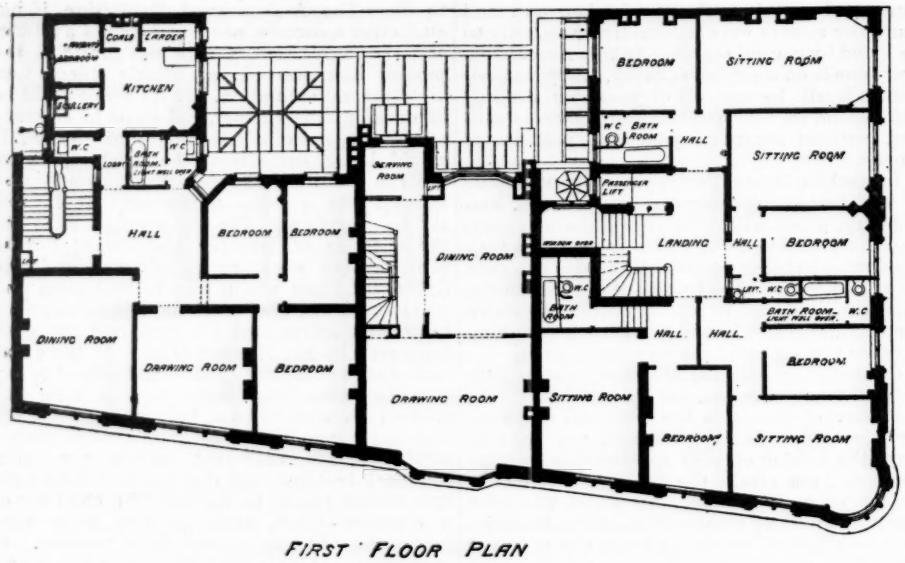
Mr. C. R. Pink considered that the address was just what was wanted at the present time. He certainly agreed with Mr. Tarver that there was a modern architecture and a modern style. This year he had studied a church not many miles from Lichfield, and he considered that, within its scope and limits, it was as fine a church as he had seen of any period.

Mr. Cole A. Adams believed that Mr. Appleton's suggestion for the study of modern work would be heartily taken up. The suggestion for a common-room, or practically that club life should be added to the Association, was also an admirable one. He bore testimony to the labour involved in the production of the "Brown Book," and thought the time could not be far distant when some paid assistance would have to be forthcoming to meet some of the routine work which now fell upon the honorary secretaries. The cost of this and of other advantages would, however, he believed, have to be met by raising the subscription.

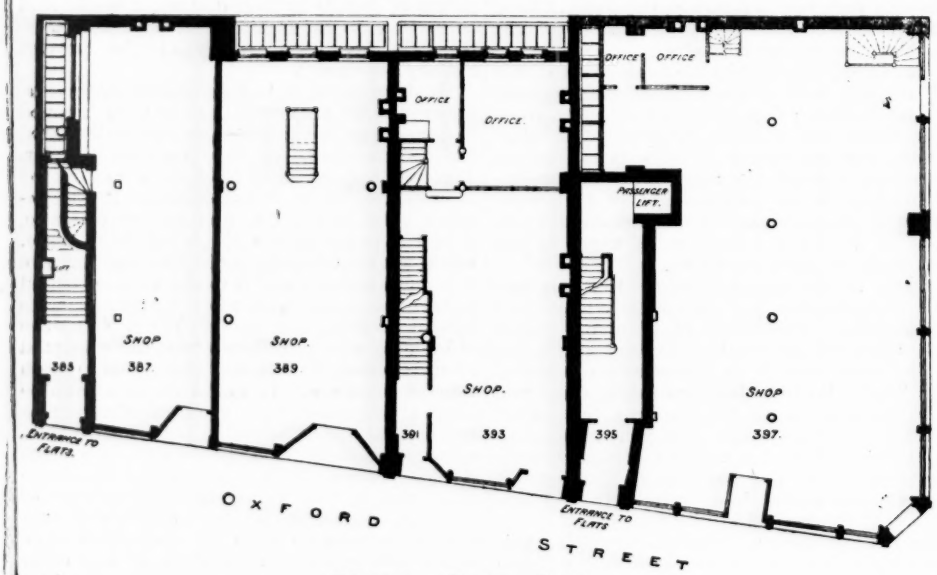
The vote of thanks was then put to the meeting, and carried by acclamation.

The President, in replying, said he would strive to make the proposed common-room a success, if the older men would only come forward and help. He supposed the members had seen a letter in that week's *Builder*,* which

* "A Residential College for Architectural Students." See p. 287, *ante*.



FIRST FLOOR PLAN



GROUND FLOOR PLAN

Shops and Residential Chambers, Oxford-street.

deserved careful consideration on the part of those who were up in London for limited periods, and referred to the desirability of forming a sort of common club dwelling.

The proceedings then terminated.

Illustrations.

CAPITALS AND WELL-CURBS, VENICE.

SINCE the appearance of Mr. Ruskin's "Stones of Venice," the series of capitals of the lower arcade of the Doge's Palace have always been regarded with exceptional interest. We think their artistic value is exaggerated in that book, as is Mr. Ruskin's way when he admires anything. The foliage is not in all cases equally interesting and graceful, and the figures are sometimes coarse, and sometimes meaningless. Nevertheless, as a whole they are beautiful things, and we think the four we give to day will be acceptable to our readers. The figures in the top left-hand cap represent the virtues, of which "Largitas" occupies the front side. The meaning of the figures in the next capital is uncertain: those in the lower left-hand one are apparently sculptors and architects; some are crowned. The last capital is that at the "Judgment Angle," the three subjects on the sides shown in the print are the Emperor Trajan and the widow in the middle, Moses receiving the law, and Justice enthroned.

The two well-curbs show how this very prosaic necessary adjunct of life in Venice was made a field for the sculptors' art at two different epochs. The imagination of all travellers to Venice is srtuck by these curbs in every courtyard, from the magnificent bronze Renaissance ones at the Ducal Palace, to the half-barbarous Byzantine examples in coarse stone to be found in some of the more out-of-the-way corners.

KETTERING CHURCH, NORTHANTS.

THIS reproduction of a capital measured drawing by Mr. James Hardman will be of interest in connection with the article, in another part of this number, on the Weldon stone district, and is there referred to.

SHOPS AND RESIDENTIAL CHAMBERS, OXFORD-STREET.

THESE premises, which are now rapidly approaching completion, form part of a considerable amount of reconstruction upon the estate of the Duke of Westminster.

The basement and ground-floors are devoted to shops, and are separated by fire-proof floors from the flats and chambers above. The eastern block, as will be seen by a reference to the plan, is constructed with one set of rooms, having two sitting-rooms bed-rooms, kitchen, and servants' accommodation, &c., upon each floor; while the western block is divided up for bachelor suites of two rooms (with bath, &c, to each set), with a common kitchen on the south floor.

The fronts are in red gauged brick (obtained from Lawrence, of Bracknell), with Ancaster stone dressings, with green slating, the style of the buildings being French Renaissance, with high dormers, projecting bay, and corner turret. The height of the structure, and the necessity of keeping unobstructed the areas of the shops, entailed the use of a large quantity of iron, which was supplied by Messrs. M. T. Shaw & Sons, Messrs. Moreland & Son, and Messrs. Gimson, of Leicester.

Messrs. Laurence & Sons, of City-road, were the builders of Nos. 385 to 393; and Mr. Chas. Cox, of Hackney, the builder of Nos. 395 and 397.

The lifts, passenger and luggage, were supplied by Messrs. Smith & Stevens.

The work has been carried out from the designs of Messrs. T. Chatfeild Clarke & Son, and under their direct supervision.

RESIDENCE AT SUTTON, SURREY.

THE materials of which this house is being built are local red bricks and hanging-tiles, and Broseley roofing-tiles. The vertical tiling is fixed to brickwork, with breeze concrete fixing-blocks on the principle recommended by Mr. Ralph Nevill. The half-timber work is yellow fir, left rough from the saw, and Stockholm tarred.

The plan is arranged to make the dining-room 12 ft. high, and the drawing-room and study 10 ft. high.

The morning-room is placed by the second staircase, to be used in connexion with the nurseries, so as to allow the children access to the garden without passing through the hall. The nurseries are over the kitchen and scullery, and are served with a lift. There are five bedrooms and a bath-room on the first floor. The work is being carried out by Mr. J. B. Potter, of High-street, Sutton, Surrey, from the design of Mr. Herbert D. Appleton, F.R.I.B.A.

STABLES AND COTTAGES, HEATH HOUSE, BANSTEAD.

THE stables are built of Epsom red bricks and Ewell hanging-tiles, with Broseley roofing-tiles, the internal facing of the stables being Cliff's salt-glazed and white-glazed bricks. The ceiling of the stables is covered with Willing's enamelled iron plates. The stable-fittings are from the St. Pancras Iron Company. The coachmen's rooms are over the harness-room and coach-house.

The gardeners' cottages are built with the same materials, and have three bedrooms each on the first floor.

The work is being carried out by Mr. E. J. Burnand, of Clifton-road, Wallington, Surrey, from the designs of Mr. Herbert D. Appleton, F.R.I.B.A.

COMPETITIONS.

Manse at Knutsford.—The trustees of the Congregational Church have decided to erect a residence for their minister on a site adjoining their present church. As a result of a limited competition amongst architects, the designs submitted by Mr. J. H. Burton, of Ashton-under-Lyne, have been adopted.

Sculpture for Portsmouth Town-hall.—In a limited competition for designs for filling the tympanum of the portico of the Portsmouth Town-hall with sculpture, the sketch sent in by Mr. H. F. Margetson, of Bristol and Chelsea, has been accepted by the Corporation. The estimated cost is 1,380*l.*

The Surveyors' Institution.—The first ordinary general meeting of this Institution for session 1888-89, will be held on Monday, November 12, when the President, Mr. E. P. Squarey, will open the session with an address. Chair to be taken at eight o'clock. It is announced that those proposing to enter their names for the Students' Preliminary Examination, to be held on the 22nd and 23rd of January, 1889, must intimate their intention to the Secretary before the last day of November. It is proposed to examine candidates from the counties of Lancashire, Cheshire, Yorkshire, Durham, Cumberland, Westmoreland, and Northumberland, at Manchester. Candidates from other counties in England and Wales will be examined in London. Students eligible for the Proficiency Examination (which will commence on the 8th of April next) must give notice of the sub-division in which they elect to be examined, not later than the last day of November. Examinations qualifying for the classes of Professional Associates and Fellows will also commence on the 8th of April next. Names of applicants for these latter Examinations to be sent in before the 12th of January next. All particulars as to days, subjects, and course of examination will be forwarded on application to the Secretary. Candidates for the Professional Examinations will be examined in London only.

THE HANSARDS OF THE STEEL-YARD.

Passing events at Hamburg remind us of the settlement which the favoured Easterlings once held in our midst. On June 15, 1881, after a memorable debate, the House of Burgesses at Hamburg adopted, by 106 to 46 votes, the Senate's resolution for the inclusion of that city within the Zollverein, or Customs Union of the German Empire. On Monday, October 15 current, Hamburg ceased to be a free port as belonging to the ancient Hanseatic League, and its new and vast bonded warehouses were opened. Within a few days Bremen will, of its own free accord, undergo a similar change.

Lübeck, founded in the twelfth century, and Hamburg, by Charles the Great, in the ninth, were the earliest members of the League which is believed to have originated, for common protection and intercourse, at the end of the twelfth or beginning of the thirteenth century. Since to follow its commercial history were beyond the scope of our journal, we will only say here that along the Baltic shores the League exercised a dominion like to that of Venice over the Adriatic. Consisting of four confederate circles, at head whereof were, respectively, Lübeck, Brunswick, Dantzic, and Cologne, it enjoyed its apogee of credit and power during the fourteenth and fifteenth centuries. Its foreign commerce embraced nearly all that of Poland, Russia, Denmark, Prussia, and Scandinavia, in exchange for which it gave security in business and extended the arts of civilisation. The principal fair was held at Bruges, where as early as 1318 we read of the arrival of five large galleasses from Venice. Novogorod, the chief emporium in North-eastern Europe, never recovered from the vengeful massacre by Ivan IV. in 1570. The Easterlings, or King's men, came in their ships to Billingsgate in times remote, and secured Æthelrhed's protection. By the thirteenth century, and known as the Hansards, they had obtained a settlement in London, and for a long term exercised the exclusive right of importing wheat. Our kings, Henry III. and Edward I., enlarged their privileges; as did also the Corporation, in consideration for the repair and maintenance of Bishop's Gate, and an undertaking to defend the City when assailed. They repaired the gate in 1282, and in 1479 supplied funds for its rebuilding. So mightily did they prevail, that to adjust pretensions which they were quite ready to enforce with the sword, Edward IV. assigned to these merchants of Almaine a permanent property on the site and buildings which they then occupied at the Stapel, or Stäel, Hof, in Upper Thames-street; together with certain wharves and other messuages at Boston and at Lynn. As modified by later sovereigns, these and other liberties were finally abolished by Queen Elizabeth, who, in a proclamation of February 28, 1598, summarily bade them quit her kingdom.

In a bird's-eye view of London, contained in Braun and Hogenberg's "Civitates Orbis Terrarum" (1572), the "Stiliards," with its cranes and warehouses, is clearly drawn and named. The style of Steelyard is, in all likelihood, derived from the circumstance that hither, by Dowgate Wharf, at foot of Dowgate-hill and a little westwards of Shrewsbury or Poultney-inn, had been carried the king's weighing-beam, or yard, from East-Chepe.* Of its subsequent history there is little more to be told than what may be read in Cunningham's "Hand-book of London," to the effect that within a year of the Hansards' ejectment the Lord Mayor was called upon to surrender the premises, it being designed to appropriate them for the landing and warehousing of naval stores. As elsewhere, so in London, the merchants themselves formed a quite separate community of their own, dining at a common table, and leading celibate lives. Their former habitation, long marked by the Steel-yard stairs, was swept away at the building of the South-Eastern Railway terminus in Cannon-street. Mindful, however, of their former holding and immunities in London, they caused to be made in Hamburg, for the parish church of All Hallows the Great, the fine oaken screen (supposed to have been given *temp.* Anne), whereof an engraving by T. Turnbull, after R. W. Billings, was published by the late Mr. George Godwin, in his "Churches of London" (1839).

* There is also a Steel-yard in New-street, to the east of Guy's Hospital, in which is a tavern by sign of the "Ship and Shovel."

MANCHESTER SHIP CANAL WORKS.

Owing to the skill and energy of the contractor and his staff, this gigantic undertaking appears to be making very rapid progress. On the occasion of a recent visit, we were much struck by the magnitude and completeness of the plant employed, a brief description of which may be of interest to our readers. The greatest progress appears to have been made at Eastham, where nearly two million cubic yards of earth have been removed and used, chiefly in levelling the shore. No great engineering difficulties have as yet been encountered, either here or on the other sections. The excavations consist chiefly of soft earth, boulder clay, and red sandstone, and it is proposed to use some half million tons of this latter for facing the canal. The whole length of the canal, 35¼ miles, is divided into nine sections, each section having a complete engineering staff, plant, and band of workmen. On each section, mission-rooms and hospital accommodation have been erected by the contractor, who appears to have amply provided for the comfort of his work-people, of whom there are nearly 12,000, on this and the Bridgewater Canal undertaking. The basin, which is the site for the locks at Eastham, is well forward, and we understand it is proposed to erect three locks abreast of each other, the largest measuring 600 ft. by 80 ft.

The plant consists of some 98 locomotives, 3,221 tipping wagons, 51 steam navvies, 49 steam cranes, and 104 pumping and other engines, besides numerous smaller machines.

The largest number of navvies or steam-diggers are of the Dunbar and Ruston type, described and illustrated in the *Builder* of August 5, 1885. Several of these operate two-yard buckets, and are capable of placing, with two movements of the machine, some four tons of material into the trucks. We were informed that one of these machines running throughout the day, and operated by two gangs of men, had filled no fewer than 640 trucks; or, in other words, had excavated some 2,500 tons of material, which must be considered a really remarkable performance.

The French excavator manufactured by Messrs. Boulet & Cie., of Paris, has attracted a good deal of attention, and appears to do excellent work. Its general description is as follows:—Main framing of the machine of wrought iron, 30 ft. long, and with a top tumbler-shaft 18 ft. above the level of the rails. It travels on three lines of rails laid on 9 ft. sleepers, the front rails being 1 ft. 8 in. and the inner ones 4 ft. 8½ in. apart. On these rails rest ten wheels, four of which are geared for travelling, the motion being given through the medium of a pitched chain. The horns or ladder project from the front, and the jib is pivotted from the top tumbler and raised or lowered by a chain over the horns. The boiler is of the multitubular type, 21 ft. long by 4 ft. diameter, and with a single flue—working pressure 140 lbs. to the square inch. The main driving engines are a pair of diagonal non-condensing engines, cylinders 9½ in. diameter by 19½ in. stroke, and make 85 revolutions per minute. The jib is raised and lowered and the excavator traversed by a small pair of engines, cylinders 6 in. diameter by 6½ in. stroke. The trucks to be filled are arranged to run on rails at the back of the machine, and the excavator shoot delivers into these. Five men operate the machine, viz, engine-driver, fireman, bucket-man, and two men to attend to the shoots. In positions where there is ample suitable material this machine should answer well, and we were informed that in a very moderate depth it has filled some 590 trucks in a day of ten hours.

Several German excavators, constructed by the Lubeck Machine Construction Company, are also at work. These are arranged with lateral traverse, and differ considerably in their method of working from the machines already noticed. They are mounted on three lines of rails fixed on the top of the slope, along which they gradually travel whilst working. The main frame of the machine is of wrought iron, from the front of which two horns, hinged at the foot, project, and between these is hung the jib along which the excavating buckets travel. The machine is mounted on sixteen wheels. The excavating buckets are made without backs, and are segments of a circle. When the machine is set in motion, these buckets are dragged up the face of the excavation, and discharge their contents as they pass over the top tumbler. The boiler is arranged to counterbalance the machine, and is a single-flued multitubular, 16 ft. long by 5 ft. diameter. A pair of engines, 9 in. cylinders by 13 in. strokes, are the motors. Four men are employed to work this excavator. The chief operations are controlled by the engine-driver, who has levers for stopping and starting the machine and buckets, and for regulating the depth of the cut taken by them. This latter is done by raising and lowering the jib. The machine is arranged to travel along the rails at a speed of about 12 ft. per minute, and the depth of the cut is regulated according to the hardness of the material, but under ordinary circumstances it is stated to be capable of loading about 430 4-yd. trucks in a day. The weight of this excavator is 60 tons.

A number of Whittaker's combined steam-cranes and navvies are in use; they are arranged with a self-acting traverse on an ordinary 4 ft. 8½ in. railway gauge-rails, with outer wheels of 7 ft. 6 in. gauge. It is constructed chiefly after the fashion of an ordinary steam-crane, the dredging or excavating being done by a chain passing over the head of the jib. The bucket is attached to an adjustable quadrant fitted to the jib. The position of the quadrant can be raised or lowered as may be found necessary. A steam cylinder is hung in trunnions on the jib, and, through the medium of a pair of cranks, operates the quadrant to which the dredging-bucket is attached. The bucket can be readily advanced or retired against the face of the cutting, and should it come in contact with rock, and pressure exceeding five tons be put on it, it will retire automatically and pass round the obstruction. This is an ingenious arrangement, and in cuttings where the nature of the strata varies, should lessen the chance of breakage considerably. The weight of a ten-ton crane and dredger complete is only thirty-two tons, and the ready way in which these machines can be handled should bring them into more extended use.

The workings are lighted at certain points by electricity and by the "Wells light" (Wallwork & Wells' patents). The operation of this light is briefly as follows:—Suitable steel tanks are employed, and a hand-pump is screwed into the crown of the lamp, and charges it either with oil or air as may be required. The air in the tank is compressed to about 25 lbs. pressure to the square inch, and the lamp-burner is heated by burning a little oily waste in the cup. The admission valve is then opened, and the oil is forced up by the air pressure into the heated burner, and being converted into gas issues from the jet in a large flame. The heat of this flame passes continuously through the generating tubes, and converts the ascending oil into gas. For large canal, dock, and similar works this light should prove itself of service, as it gives a good light and requires little attention.

At various points the boulder clay is exposed; it is interspersed with pebbles, and this same strata is believed by Mr. Leader Williams—the Engineer to the Canal Works—to extend from Eastham to Nantwich, and thence onwards to the salt mines of the Severn and the Bristol Channel.

Clay suitable for brickmaking has also been met with, and this is being turned into bricks by the contractor at the rate of about 150,000 per week, and will be used in erecting the various warehouses and buildings necessary on the banks of the Canal.

Although up to the present no formidable engineering difficulties have been encountered, this will not be the case after the works have passed Barton, as the Bridgewater Canal crosses the line of the ship canal. We understand it is proposed, in carrying the Bridgewater Canal over, to try a very novel engineering experiment—viz., the employment of a swinging aqueduct. This plan is, we believe, unique in canal engineering, and although the work will necessarily be costly, we do not see any reason why it should not be successfully accomplished. A large weir is also to be formed in the river, which will be heavily embanked for a considerable distance. When this extremely interesting work is still further advanced we hope to be able to refer to it again.

A Tall Chimney.—What is described by American papers as probably the tallest chimney in the world is now being completed at East Newark, New Jersey. The diameter at the base is 28 ft., and the ultimate height of the brick structure will be 310 ft., with a diameter at the top of 9 ft. A cast-iron rim 20 ft. in diameter and a bell surmount the whole, and will make the total height of the chimney 335 ft. In its construction 1,700,000 bricks were used, and the total cost will be 85,000 dols.

THE GLASGOW INSTITUTE OF ARCHITECTS.

The twenty-first annual general meeting of this Institute was held on the 16th inst., Mr. David Thomson, the President, in the chair.

The President said the members were all aware that the Institute had sustained a very serious loss by the death of Mr. James Sellars—a young man whom they looked forward to holding a foremost place among the architects of this country, and whose work revealed so much power and ability and beauty.

Mr. William Maclean, secretary, read a notice which it was proposed to insert in the minutes, recording the deep regret of the Institute at the death of Mr. James Sellars.

The President formally moved the approval of the minute; and

Mr. Maclean, the secretary, read the following extract from a letter from one of their members, Mr. John J. Stevenson, London, to Mr. W. F. Salmon:—"I should like to join in any expression of regret or sympathy of the Institute at the loss by Mr. Sellars's death."

The President mentioned that a meeting was then being held for the purpose of getting up some memorial to Mr. Sellars in Lambhill Cemetery.

The minute was agreed to.

Mr. William Maclean, the secretary, read the twentieth annual report by the Council, from which we make the following extracts:—

"The Council have to record with deep regret the deaths of Messrs. James Salmon and James Sellars, the oldest and the youngest of the past presidents of the Institute, also of Messrs. James Thomson, West George-street, and John M'Leod, both for some time members of council, which have taken place since last report. A committee was appointed in the beginning of the session on the subject of technical education. The committee met with a committee from the Glasgow Technical College and discussed the matter with them, with the result that a curriculum was prepared, and, after being considered and approved of by the Institute, circulated among the members of the Institute for their guidance in the education of their apprentices and of architectural students. The Council hope that members will, in as far as possible, see that the education of their students is carried out on the lines indicated in the curriculum. A representation was also made by the Council that the architectural profession was not represented on the governing board of the college, with the result that Mr. Honeyman was elected to the first vacancy, and now represents this Institute on that board. The rules for the measurement of wright work have been revised by delegates from this Institute, the Institute of Measurers, and the Master Wrights' Association. Unfortunately the measurers' delegates withdrew before the revisal of the rules was completed, and the other representatives were left to complete the work, which they have now done, but the issuing of the rules has been delayed in the meantime. Delegates have been appointed at the request of the Institute of Measurers to draw up rules for the measurement of painter work. The Council again put forth an effort to have a separate Building Act for the City of Glasgow, and prepared a memorial to that effect, which was submitted to the Boundaries Commission. The memorial asked that if the boundaries of the city were extended, the Commission should recommend that a Building Act be passed, and proper machinery provided for its operation. This, however, the Commission considered to be outside of their powers. The proposed Bill for the registration of architects and engineers was considered by the Institute, and it was agreed to intimate to the promoters that this Institute would oppose the Bill unless its operation was limited to England. In this matter your Council has had the support of the Edinburgh Architectural Association and of the Dundee Institute. At the request of the Royal Institute of British Architects, a petition was prepared and forwarded against the passing of the Bill, which has since been withdrawn. The Institute again agreed to continue the prizes to Haldane's Academy. The examiners last year were Messrs. James Thomson and David Thomson. A communication was received from the Royal Institute of British Architects, asking the opinion of this Institute on the subject of the alliance of non-metropolitan societies with the Royal Institute. After consideration, a reply was given to the effect that this Institute would be glad to form a closer alliance with the Royal Institute, provided that could be done without any loss of the independence and freedom of action which it at present enjoys. It was mentioned in last year's report that the drawings in the competition for the travelling studentship were to be sent in on the 15th of December, 1885. Six sets of drawings were received at that date, which were exhibited for a fortnight in the Corporation Galleries. On the 28th of December the trustees met, and, after careful examination, awarded the prize to Mr. Wm. James Anderson, 62, Cadder-street, Pollokshields. Mr. Anderson, in fulfilment of the conditions of competition, made a sketching tour in the spring and early summer of the year, and spent fully twelve months in Italy. On his return he submitted the sketches and drawings which he had made, together with a memoir descriptive of his travels. The trustees had every reason to be satisfied with the competition and its results."

The Treasurer (Mr. Watson) also submitted his statement.

The President, in moving the adoption of the report, said that since he assumed office two years ago death had been very busy amongst them, and had carried off many of their oldest and best friends. One of the first was Mr. George Bell, one of the most respected men in the City of Glasgow. This year they had been specially unfortunate. Early in the year they lost their first president, Mr. Salmon, a man very highly esteemed. Shortly after that they met with the loss of Mr. James Thomson, of West George-street, who had long been a member, and a man of very quiet and retiring disposition. After that they lost Mr. John M'Leod. After that, and only within the last few days, they had met with the loss of Mr. Sellars, a man who took a most active part in the affairs of the Institute, and had its interests very thoroughly at heart. From the heavy losses they had sustained it became all the more incumbent upon the members who remained to exert themselves in the interests of the profession. They could not promote the interests of the Institute in a more thorough way than by increasing its members and bringing within it all the eligible men who are within the city and within the province of Glasgow or the West of Scotland. The Exhibition, he went on to say, was expected to yield a very heavy surplus. Many were at a loss what to do with this large surplus. He would suggest that the Institute should approach the Executive and see whether they would spend 5,000*l.* or 10,000*l.* of this surplus, if they could spare it, and devote it to the establishment of a Chair of Architecture in the University. It would be one of the most suitable, one of the most satisfactory, and one of the most praiseworthy acts that could be done, and a very appropriate and suitable mode in which a part of the surplus at least might be expended. In the past two years he had done all he could for the interests of the Institute. In that he had been seconded and encouraged by the office-bearers and the council and members of the Institute, and he desired to thank them all severally very cordially for their very warm support. Specially he commended to the thanks of the Institute Mr. Watson, the treasurer, and Mr. Maclean, the secretary.

Mr. Bromhead seconded, and the report was adopted.

At a meeting of council held immediately after the annual meeting, the following office-bearers were elected:—President, Mr. John Gordon; vice-president, Mr. William Leiper, F.R.I.B.A.; hon. treasurer, Mr. Thomas L. Watson; auditor, Mr. James Thomson; secretary, Mr. William Maclean.

THE SEVERN TUNNEL:

ITS ORIGIN AND CONSTRUCTION.*

The history of the Tunnel is this:—In about the year 1862, while superintending the construction of the Bristol and South Wales Union Railway and its Severn piers at the New Passage, I was greatly struck by the peculiar character of the river itself, and of that part of its channel, both of which appeared to me to be singularly favourable for the construction of a tunnel underneath the waters instead of the proposed ferry over them,—an idea, it may be supposed, not unnatural to one whose first engagement, in practical engineering work, had been in the building of the Thames Tunnel. This was under the elder Brunel.

I mentioned my idea, first, to Mr. Leonard Bruton (the able secretary), and afterwards to the directors of the above-mentioned railway, with my reasons for knowing it to be practicable; and I found that they were highly favourable to it. I then further investigated all the facts bearing upon the scheme, and prepared plans, which were first deposited in Parliament in 1863, but had to be dropped for want of money.

Before this time, I had fully appreciated the two physical facts which, in my opinion, insured the practicability of the scheme,—first, the remarkable hardening of the strata in and around the English stones, which had enabled them to resist the action of the powerful currents and the storm-waves up to that time; and, secondly, the mud, sand, and gravel carried by the Severn waters, which must, of necessity, choke up any leakage into works below, through such hardened strata.

After a good deal more labour, and some further vain attempts to get the scheme taken up locally, during a period of nearly ten years, it was finally adopted by the Great Western Railway Company, and an Act was obtained for it in 1872.

Sir John Hawkshaw was, at that time, invited to give evidence in support of the Bill in its passage through Parliament; and, after the Act was passed, he was retained as consulting engineer at a small retaining-fee, while I was chief engineer.

The plans were the same as I had at first designed them in 1863.

Under the peculiar formation of the Severn channel at the place I had chosen for crossing under the river, the 400 yards of deep water in the "Shoots" channel was the key to the practicability of the whole of this large and novel undertaking; for the rest of the river-bottom could always be got at at low water. The directors had, therefore, prudently and wisely decided to prove the practicability of this part, by the actual driving of a working heading through that ground, before they proceeded to spend any money on the very heavy collateral works; which money would have been simply thrown away if the ground under the Shoots should prove to be impracticable.

As so much depended on this 400 yards, therefore, the first object, after getting the Bill, was to obtain the most precise knowledge possible of the external form of the Shoots channel itself, in order to select the best place for crossing it within the 300 yards' limit of deviation allowed by the Act.

Special methods and instruments were devised for taking, and locating exactly, the necessary soundings; and, by these means, really accurate sections were made across the channel of the Shoots at every 10 yards within the limits. These could only be taken at the turn of the tide, when there was comparatively little current, and this lasted for only twenty minutes at low water of an average tide; thus the getting of these necessary sections took much time—twenty minutes only being a day's work.

In the end, the result was quite satisfactory, and then the centre line was fixed. But, now, further delay was caused by the determined opposition of the navigation authorities to the building of a shaft-head upon the low-water rocks at the edge of the Shoots, in the manner provided in our Act.

After much discussion, this point was eventually conceded, and the shaft was placed on shore at Sudbrook, half a mile from the Shoots. It was started in 1873, and the heading towards the Shoots was begun at the close of 1874.

This heading had now to be driven half a mile from Sudbrook shaft before it got up to the Shoots; but, when it had been carried under them, it was found that the ground there was a remarkably close and hard Pennant rock, in solid beds of great thickness, entirely free from "backs" or fissures, and between which the joints were so thin as to be hardly perceptible, except where, in blasting, the rock naturally came away to the joint. This was about the soundest, strongest, and best material for our purpose.

This point having been settled, the other shafts were then got down, and headings started from them in both directions with the object of proving the whole of the ground through the tunnel before letting the work in several contracts, which would then have been tendered for under a full knowledge of what had to be met with,—thus avoiding the large claims for possible contingencies which must otherwise have been made by contractors in so novel a work.

This plan was quite successful so far as the part under the river was concerned; but it was knocked on the head when the big land-spring was struck, a quarter of a mile inshore from the river, on the Sudbrook side, and flooded the works, in October, 1879, at a time when the river-heading had been nearly five years at work, and had been driven two miles under the river from the Sudbrook shaft. It was within 136 yards of meeting that from the Seawall shaft on the other side of the river. The heading had at that time been driven two miles under the river, from one end; that makes a

* From a paper read on the 16th inst. by Mr. Charles Richardson, C.E., before the Engineering Section of the Bristol Naturalists' Society.

speed of 15 yards a week, including all delays; and it was driven true to the last inch.

It may here be observed that my argument had always been, that, from what I knew of the river, we should have no trouble from the Severn water above, which was what everybody appeared to dread. I did not pretend, however, to form any judgment as to spring water from below.

This sudden flooding of the works by the great land spring naturally threw the directors into a state of great alarm. They then asked Sir John Hawkshaw to undertake the main responsibility of the work, and make us joint engineers, of whom he was chief. From that time I couid advise, but he could decide.

I believe the spring could then have been shut back in a month by boring an 18-inch hole down into the heading and pouring in liquid cement till that part of the heading was filled up; but the engineer-in-chief would not hear of it.

Sir John then decided to let the contract for the whole work of Mr. Thomas A. Walker; also to lower the gradient 15 ft. under the Shoots, at an estimated cost of 50,000*l.* For this a new Act had to be got.

My opinion was altogether against the depression of the gradient after five years spent in driving the heading, at its then level, all across the river, and finding under the Shoots the strongest and safest rock possible. I suggested, in preference, the driving of a top heading 20 ft. above, along the 300 yards of deep water,* to prove the ground there also; for it seemed to me that the chances of finding any open joints in those compact beds of rock were purely imaginary, and it could have been done in twenty weeks; but here again my advice was disregarded. The 15-feet lowering also increased largely the flow from the Big spring; for when it was tapped a second time, on October 10th, 1883, at the 15 feet lower level, and 90 yards nearer to the shaft, it rushed in in fourfold quantity, and flooded the works for the second time—the first inrush having been at the rate of 6,000 gallons, while the second was 27,000 a minute.

It may be mentioned here that when the contractor began to open out the heading under the Shoots into the full-sized tunnel, he also became of the opinion that the 15-feet lowering had been unnecessary,† for, on one occasion, when he, Sir John, and I were standing at the shaft-head about to go below, he suddenly remarked to Sir John: "We were afraid in the wrong place, Sir John," and this he repeated when Sir John did not, at first, catch his meaning.

So much for the Shoots. But another reason alleged for the depression of the gradient was to get more head-covering under the Salmon Pool on the English side of the river, where the ascending gradient brought the top of the tunnel brickwork to within about 18 ft. of the river bottom. This was more reasonable; but there the river bottom is accessible at low water of every tide, and I had always intended to form an artificial roof over the tunnel works there, by laying down a bed of cement concrete—say 60 ft. wide and about 5 ft. thick in the middle parts. This would have kept out all Severn water. As it was, on the contrary, no precautions were taken, and the Severn water did get in in two places, and caused much trouble and expense; for the ground there is of a softer character than that near the Shoots.

With this exception the tunnel has, in all its main features, been built entirely according to my plans as originally designed before it was adopted by the Great Western Railway Company; the only other difference being that the brickwork all through, both in the tunnel and in the bridges outside, was made very much heavier than I think at all needful, and that all arches have been built in rings of brickwork instead of with the "vertical bond."

I have long considered ring work both weak and untrustworthy. I have not used it myself for twenty-five years; and, in consideration of my views on this subject, a clause (with drawings) was inserted in the specification to Walker's contract to the effect that the "vertical bond" should be used in arches and inverts instead of "ring" work, if the Engineer-in-Chief should give a written order to that effect; but an extravagantly high price was put upon that sort of work, and the order was never given. All arches and inverts were, therefore, built in "rings"; and in the tunnel, although each was six rings thick, the pressure on the brickwork of the invert was just double what it was on the arch, because of the greater head of water and the larger radius of curvature: the invert, therefore, displayed the greater weakness. The result was that when the water pressure was put upon the brickwork by corking the pipes, the invert was blown up in a remarkable, though in a quite explicable, manner. The inner ring was blown up first; after that was gone, the second ring was blown; and after that, the third ring was rising, and would clearly have gone in the same way, when the contractor withdrew the plugs and took off the water pressure. This occurred in many places in the invert.

The water-pressure under the invert had been about 60 lb. on the square inch; and thus was proved the fact that "ring" work cannot be relied upon to bear heavy water-pressure, and that is why all the water had henceforth to be pumped.

This having then become apparent, the opening of the railway had to be deferred a year in order that a new 29 ft. shaft should be got down and six large Cornish pumps fixed in it, each capable of raising five million gallons a day. The cost of pumping will, therefore, be a perpetual charge, notwithstanding the excessively heavy brickwork. For example, by the contract one-half only of the tunnel was to have an invert; but it was decided to invert the whole, and this alone added 80,000*l.* to the cost.

This kind of brickwork, and the depression of the gradient, are the only departures from my original plans. The result of the 15 ft. depression is that: (1) the trains have 1,500 ft. more gradient to climb; (2) the pumps have to raise all the water 15 ft. higher; (3) the water-pressure on the brickwork was increased 7 lb. on the square inch; (4) the flow from the Big spring was very largely increased by tapping it at the 15 ft. lower level; and (5) the additional cost, together with that of the unnecessary brickwork, has amounted to a very large sum.

* 400 yards is the top width and 300 yards the bottom width of the Shoots channel.

† This also appears from what he says, p. 25, of his own book.

THE SHAFTESBURY THEATRE.

THIS new theatre, just opened, has been erected for Mr. John Lancaster from the designs and under the superintendence of Mr. C. J. Phipps, F.S.A. According to a description which has been sent to us, the theatre stands absolutely isolated, the site being surrounded by Shaftesbury-avenue, Nassau, Gerrard, and Greek-streets, affording access and egress for the public by thirteen doorways into three streets, and for the employés on the stage of five doors. The entrances exclusively for the stalls and balcony-stalls are by five doorways in the principal façade, fronting Shaftesbury-avenue. The entrances to the upper circle and pit are in Nassau-street, with corresponding entrances for exit in Greek-street. The entrance to the amphitheatre and gallery is in Greek-street, with a corresponding entrance and exit in Nassau-street. There are also two additional doorways, one in Nassau-street and one in Greek-street, on the level of the private boxes of the balcony tier, respectively, for the use of the Prince of Wales and the proprietor, but always open and available for the audience on that tier.

The principal entrances in the façade open on to a spacious vestibule, immediately in the centre of which, facing the doorways, is the entrance to the balcony stalls, by a short and direct flight of marble steps. The entrances to the stalls (which are below the level of the street) are right and left of the vestibule. There are glass and iron awnings extending over the pavement at all the entrances for the public, thus affording protection for every division of the audience in case of rain.

The whole of the various tiers and galleries of the theatre are constructed of iron and concrete. Each tier has a corridor six feet wide surrounding it. The high-pressure water-mains are laid on to every part of the building. Refreshment-rooms are provided for the several divisions of the audience. The frontage, which is of stone, and Italian in style, has a covered loggia on the first floor, with a wide balcony opening out from the refreshment-room on the upper circle level. There is also a wide balcony on this loggia opening out from the top level of the gallery. There are also in each side street iron balconies, with means of exit from each upper floor above them. The stage, which is 65 ft. wide by 45 ft. deep, is situate at the back of the block, opening on a level with Gerrard-street; it has a height of some 54 ft. to the gridiron. The dimensions of the auditory are as follows:—

	ft.	in.
Curtain to front of dress circle	35	0
" " upper circle	40	8
" " gallery	44	6
" back of pit	58	4
" " stage	45	0
Width of stage opening	30	0
Height " "	30	0
Centre of pit floor to ceiling	47	0

The total accommodation provided is for about 1,800 persons. On either side of the proscenium opening are seven private boxes, one on the stalls level, and three on the first and second tiers.

The hangings are of plush, a rich brown colour, lined with salmon-colour silk. The colours of the decorations are light French grey and gold, and the walls of the theatre are covered with a dark terra-cotta paper. The stage is separated from the auditory by Mr. Max Clarke's patent protected iron curtain, covered on the audience side with green baize, and worked by hydraulic power supplied from the mains of the Hydraulic Power Company, which run up in the subway underneath Shaftesbury-avenue. The auditory is at present lighted by a gas sunlight, but it is proposed very shortly to instal the electric light all over the building.

The following are the various contractors who have been engaged upon the works:—Messrs. Patman & Fotheringham, for the whole of the builders' work, including stage; Messrs. Morland & Son, for the ironwork; Messrs. Jackson & Sons, for the plaster decorations; Mr. Edward Bell, for the decorative painting and gilding; Messrs. Clark, Bunnett, & Co., for the iron curtain; Mr. R. Davison, for the marble and mosaic floors; Messrs. Strode & Co., for the gaswork and fittings; Mr. C. Wadman, for the stalls and balcony seats; and Messrs. Marshall & Snelgrove, for the private-box curtains and draperies.

Mr. Raven has superintended the stage, and Mr. W. Brown has been general clerk of works.

ARCHITECTURAL SOCIETIES.

Manchester Architectural Association.—The fourteenth session of the Architectural Association was inaugurated on Tuesday evening last by a *conversazione*, which was held in the Athenæum Hall, Manchester. The room was tastefully set out with specimens of "art metal work," furniture, diagrams of stained-glass work by Mr. Hemming, of London, and various models of patents and building materials, as well as a great variety of drawings from the School of Art at All Saints, for which medals and prizes have been gained this year. In addition to these, there were drawings by Manchester architects and members of the Association. The London Architectural Association sent a number of well-worked-out designs and sketches, which were exhibited on screens. At the commencement of the proceedings, Mr. A. H. Davies Colley, A.R.I.B.A., delivered a short address, and, after welcoming the many representatives of the architectural and other societies who were present, referred to the importance of co-operation between the architectural societies, and the manner in which this had been recognised in late years. The objects of the Association were then described, and the prompt action of some of its members which had secured this year a local Examination. The following members took prizes in the elementary classes:—Class of Design: First prize, Mr. A. S. Chadwick; second prize, Mr. A. H. Mills. Class of Construction: Mr. R. Booth. A most enjoyable evening was spent in examining the numerous exhibits. The number of guests and members were upward of three hundred. The invitation card was specially designed by Mr. W. K. Booth, architect, shewing several ancient Manchester buildings grouped together *à la* "Old London" at the defunct Kensington exhibitions.

Glasgow Architectural Association.—The second of the session's lectures was delivered on the 16th inst., in the rooms of the Philosophical Society, by Professor G. Baldwin Brown, of Edinburgh University, his subject being the "Art of Decoration." There was a large attendance of members and others interested. The Hon. President, Mr. Thomas Gildard, occupied the chair. Before proceeding to the business proper of the evening, the Chair-

man referred to the recent death of Mr. Sellars, ex-hon. president, and thereafter the President, Mr. Keppie, moved that an expression of the Association's loss be minuted, and a message of condolence forwarded to Mrs. Sellars and family. The motion was seconded by the vice-president, Mr. A. N. Paterson, and unanimously agreed to. The Chairman having introduced Professor Brown, he remarked that all true art was of necessity decorative. This was literally the case in Classical and Mediæval times, but, commencing with the Dutch *genre* painters in pictorial art, and with the sculptors of the Italian Renaissance in plastic art, a distinction had arisen between the "artist" (regarded as the painter of subject pictures) and the decorative handicraftsman, a distinction which had gone on increasing to the present day. That this distinction was little felt even in early Renaissance days the lecturer showed by recalling the fact that the greatest artists of that time, Botticelli, Ghirlandajo, Giotto, each kept his *bottega* or shop open to all comers. With a reference to the principles of architecture, the mother art, all-embracive and therefore capable when known and acknowledged of duly regulating the relative values of the other arts, and, in particular, of regulating the decorative arts of to-day, the lecture terminated. A vote of thanks, proposed from the chair, was cordially awarded Professor Brown, who briefly replied.

Liverpool Architectural Society.—The opening meeting of the forty-first session of this society (1888-89) will be held at the Royal Institution, Colquitt-street, on Monday next, October 29, at 7 p.m., when the President, Mr. Edmund Kirby, A.R.I.B.A., will deliver an address. With regard to the arrangements for the session, it is announced that the ordinary meetings will be held (if business of sufficient interest is forthcoming) each month, on Monday evenings, at the Royal Institution. Papers have been promised by Sir James Picton, on "The Various Town-halls of Liverpool" (to be held at the Town-hall); and by Mr. James N. Schoolbred, on "Electricity" (about February next); and it is hoped that a member of the society will give some notes on his impressions of architecture in the United States.

A PHANTOM CLIENT.

Sir,—There is a person in the Midland Counties, of middle height, about forty years of age, who wears a sandy moustache, and whose writing and spelling are emphatically bad. This man's ways are dark, and he has been practising an extensive system of fraud on architects and builders. His method is as follows: He obtains land, and calls on an architect, whom he asks to prepare plans and obtain tenders. These being satisfactory—and the larger the better—he is in a great hurry to start building: he is particularly anxious that plenty of material should be got on the ground before the excavations are started, for, says he, it might else obstruct the pathway: he demurs to paying any instalment until the building is roofed in. When, however, the first instalment is due, he obtains a mortgage on the building and on the materials on the ground, and is heard of no more.

If asked for references, he complies with the greatest readiness. He writes his own, and goes to the town and posts them, or else, as I believe, is assisted by an accomplice. This, probably, is the only expense of the trade.

I and a builder are his last victims,—I think his very last, for henceforth he will not be under the necessity of providing for himself.

I shall feel much obliged if those who have suffered from this man, or from a similar fraud, will communicate with me without delay, as I am desirous of obtaining information against him. I already know of six towns where he has been in practice. W. H. Bidlake.

24, *Waterloo-street, Birmingham.*

THE EPIDEMIC OF DIPHTHERIA AT MIDSOMER NORTON.

Sir,—In your last issue [p. 280] you called the attention of those interested in sanitary progress to the above outbreak, intimating that this was a place where sanitation is neglected. Knowing the district fairly well, I think the following facts may prove of interest to your readers, as they are evidence of the effects of one form of modern sanitation on the public health.

Some years ago, new pipe and brick sewers, with brick manholes and gratings of the newest pattern, were laid, providing air inlets and outlets at the street level for ventilation. After working some time the gratings became a nuisance, were blocked up, and the existing ventilating-pipes were carried up buildings at the highest points to provide ventilation to the sewers.

On visiting this place some two years ago this system was considered and pointed out to me as a sanitary triumph. The fact of having no smells in the streets was considered sufficient evidence that this method of sewer ventilation was in every way a sanitary success.

Those of your readers who have for any length of time tested the working of sewer ventilation will know that to ventilate sewers by this method was an impossibility, and to those who have not had this experience I would say that the reasons why you cannot ventilate sewers by shafts (similar to a building) are that the temperature in the sewers, being lower than at the openings (in summer), the rushing of water from branch drains and sinks, and the friction on the air in the sewers caused by the sewage flow, forms a greater power than the shafts; thus, to get fresh air in any quantity through them is impossible. Knowing this, I stated two years ago to an inhabitant that sooner or later an outbreak of typhoid or diphtheria would occur.

From reading your extract of the report, the authorities do not appear to have fixed on the exact cause of the outbreak. I attribute it to air in the sewers being retained such a length of time in them, and when any air is thrown out or taken in through these ventilating-pipes it is not sufficient in quantity to affect that in the sewers. From excessive friction, traps are syphoned, and sewer gas of the worst kind is forced into dwellings, contaminating food, especially water, milk, and fish; thus the disease is started.

When two or three cases occur, the soil from them usually passes into the sewers to mix with other matter, and thus a wholesale manufactory of poison is set up, and successfully distributed over the district.

To prove whether the outbreak has occurred through water, bad joints, or sewer-air, let the water be analysed, samples being taken from all sources which are used for drinking purposes; also open the sewers at points where the disease exists, so as to obtain several bags of sewer-gas of the worst kind. Wash these samples through water, milk, and various kinds of food, noting its effects on animals as well as testing it chemically. Then, from whatever source the worst poisons are obtained, such source will prove the cause of the epidemic.

B. H. Reeves.

Cedardale, Putney, S.W.
October 24, 1888.

ARTS AND CRAFTS EXHIBITION.

Sir,—My attention has been called, somewhat late in the month, to your interesting article on the Arts and Crafts Exhibition [p. 241 *ante*], and I should be much obliged if you would allow me to correct an error of attribution, contained in the unrevised catalogue.

I had nothing to do either with the design or with the execution of the plaster frieze decoration numbered 246. To Philip Webb alone belongs the praise you justly bestow on this beautiful work.

Heywood Sumners.

Chalfont St. Peter, Bucks, Oct. 24, 1888.

MEDIÆVAL COFFIN-LIDS.

Sir,—As a contrast to the care that is being taken of the stone coffin-lids recently found near Peterborough, illustrations of which, from the sketches by Mr. Irvine, are contained in the *Builder* of Oct. 13, may I be permitted to state that in July, 1886, when walking through the churchyard of Gorlestone, Suffolk, I was surprised to find a pathway bordered with stone lids of coffins? On all, if I remember rightly, were depicted floriated crosses, and some, in addition, bore quaint designs, one being a flounder. I was at Gorlestone again this year, and need hardly state that the frost and rain are gradually leaving their marks, and all the designs are disappearing. I made rough sketches of four of the crosses, and deeply regret that I did not copy them a couple of years ago. The coffins discovered at St. Nicholas Church, Great Yarmouth, were reproduced in miniature, and presented to the Norwich Museum. As the rector of Gorlestone has recently been in London, it may be hoped that he has heard of the British Museum, and that any further antiquities he may find will be welcomed there. W. F. H.

UTILISATION OF SLATE DÉBRIS.

Sir,—In last week's *Builder*, in the "Student's Column," on Artificial Stone, you mention some of the processes for utilising slate rubbish. In addition to those you give, there is a patent granted to Mr. Granville Sharpe and myself for making Portland cement out of slate *débris*, and works are about to be erected to manufacture it on a large scale at Mr. Assheton Smith's quarry.

The slate trade is improving.—Yours truly,

Frank W. Turner.

Carnarvon, Oct. 22.

CRIPPLEGATE CHURCH.

Sir,—In your impression of last week (p. 289), I noticed that you refer to the works recently executed at this church as being carried out by "Mr. Leonard Cubitt, churchwarden and architect." This is *not* so, as all the work has been designed by me, and executed under my personal supervision.

F. Hammond.

1, *Circus-place, E.C.*, Oct. 24.

The Student's Column.

ARTIFICIAL STONES.—XVII.

Stones made with the Assistance of Alkaline Silicates (Soluble or Water Glass).

The seventh division of our subject includes some stones which have met with a considerable degree of commercial and practical success, comprising as it does all that class of mixtures to which the silicates of soda or potash or the so-called "soluble" or "water" glasses are essential additions. Mr. Frederick Ransome, of Ipswich, who has been not inaptly termed the "Bessemer of the Artificial Stone Manufacture," was the first to successfully employ these silicates for cementing the component particles of artificial stones. His first patent was obtained in 1844, and in this he claimed the employment of the alkaline silicates for cementing together broken stone, sand, or other convenient earthy or metallic matters; the blocks being subjected to great pressure in their moulds.

This patent was followed by another in 1853, which had for its object the prevention of unsightly efflorescence on the stone formed according to the last patent, and which was attributed by Mr. Ransome to the presence of alkaline sulphates. The method adopted was to add to the stone mixtures baryta or some other compound of barium, so as to effect the formation of the extremely insoluble sulphate of barium; the moulded stone was finally to be heated in a kiln to a bright red heat. In 1855 and 1856 other patents were obtained relating to the production of fusible silicate in the body of the stone at the high temperature of the kiln in which it was fired. In 1861 Mr. Ransome attempted to utilise chalk by mixing it in a powdered or broken condition with the silicate of soda and potash. After moulding, the surfaces are washed over with a solution of chloride of calcium in order to ensure as far as possible the production of a surface of silicate of lime. In another process, chalk, quick-lime, and soluble silicate are thoroughly incorporated and allowed to harden. When chloride of calcium is employed the complete union of the calcium with silicic acid takes a considerable time, and in order to avoid a loss of unchanged chloride, Mr. Ransome proposed in 1864 the immersion of the stone in a bath of carbonate or bicarbonate of soda, when the production of salt or chloride of sodium and insoluble carbonate of lime is effected. A few years later the same patentee proposed the injection of the stone with boiling chloride of calcium solution under steam pressure, and the cooling of it in a partial vacuum. A stone formed of pulverised burnt clay, lime, and soluble silicate was also patented.

A very important step in advance was made in 1872, when, to obviate the necessity of using a solution of soluble glass previously prepared, Ransome mixed with the lime, clay, chalk, sand, or other material, finely divided soluble silica, such as that found in Farnham stone, diatomaceous earth, &c., or obtained artificially in the production of the fluosilicic acid; caustic soda or potash were dissolved in the water used for moistening the mixture. The soluble silicate was thus formed in the interior of the stone, and being in immediate contact with lime, was at once decomposed, insoluble silicate of lime being formed, and caustic alkali set free; this latter again attacks a fresh portion of undissolved silica, and conveys it to the lime, ultimately the alkali itself seems to disappear, it being alleged that a double silicate of lime with the alkali, which is only very slightly soluble in water, is formed.

These are the points of greatest interest covered by Ransome's numerous patents, though only a few have been touched upon. "Ransome's Stone," then, is largely made by incorporating in a mixing-mill clean sand or other suitable earthy or silicious matters with a solution of soluble glass. The pasty mass is then pressed into moulds of desired shape, and when sufficiently dry, immersed in or injected with a solution of

chloride of calcium. To prevent efflorescence of alkali salts, the stone must be very thoroughly washed.

"Apoenite," which is the name given to the stone made according to Ransome's 1872 patent, is free from liability to efflorescence, as already explained, and the stone formed withstands remarkably well rapid changes of temperature, alternations of dryness and moisture, and the action of acid atmospheres, while it is stated that it increases in hardness and strength with age. A good imitation of Peterhead granite has been made with this stone by adding suitable colouring matters and small broken crystals of natural carbonate of lime to imitate the felspar, and, finally, polishing the surface.

Passing from Ransome's patent, we have to consider a number of other processes in which the soluble silicates are employed. Kuhlmann made artificial stone from a mixture of silicate of potash, powdered chalk, lime, limestone, or similar calcareous substances.

H. Hardinge, in 1853, employed what he termed "liquid quartz," which was formed by agitating boracic acid, soda, potash, and silica together at steam heat; angular pieces of broken stone, pebbles, &c., were cemented with this mixture, and, after drying in the moulds, the stone might be polished or varnished with a coating of the so-called "liquid quartz." To form an artificial marble the above solution was mixed with slaked lime in presence of carbonic acid gas, and, if desired, coloured with various metallic oxides.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

14,544, Concrete and Cement, &c. R. B, Lee.

In a previous specification by this inventor, a method of forming building blocks of concrete is described. This specification details improvements in the method of manufacture, principally by the use of a wirework skeleton, and the use of interlaced wirework supports, round which the concrete is poured.

14,716, Securing Wooden Blocks in Flooring, &c, A. J. Hopkins.

In wood-block flooring made in accordance with this inventon the blocks are joined by a nail, bolt, or dowel of a double-angled shape, formed to a step or shoulder at about its centre by the angle of one-half being more acute than that of the other. The fastening is effected by the use of a punch and die of a peculiar form to drive in the nails or bolts, so that, after the nail is driven into one block, another may also be fixed by the protruding half of the nail.

17,814, Preserving Wood. P. L. Quarante and Veuve d'Escalonne.

Various chemicals are used for the purpose of this invention, the proportions of which in combination are an essential part of the invention, and the wood is treated either by soaking it in a solution, or by the "Boucherie" process, or the fluid is injected in a closed chamber. It is claimed that wood treated in this manner shows no sign of decay after having been sunk in damp ground for ten years, and that there is no reason why it should not remain permanently proof against decay, as, by this preservative liquid, it is rendered imputrescible, uninflammable, and nearly incombustible.

372, Improvement in Glazing. W. Gibbs.

According to this invention, brass or other metal tubing is drawn or turned in the shape of "fret-lead," and used, for greater strength and better appearance, in glazing coloured lights.

7,669, Attaching Sash-lines to Window-frames. H. P. Miller.

By this invention a groove is cut in the side of the sash-frame from the top, and the sash-line is pushed down the groove in the frame and led out through an opening in front of the recess. A plate with spikes is then fastened over, and secures the sash-line.

10,619, Concrete with Metal Facing. J. Kleinpeter.

For fortifications and such-like purposes blocks of concrete having armour-plates let into them are used by this inventor. The plates are dovetailed into the blocks in the course of the manufacture.

11,909, Portland Cement. J. W. T. Stephens and R. Clark.

In order to utilise the blue lias pebbles and the clayey mud of the Bristol Channel and estuaries, a mixture of these blue lias pebbles burnt and powdered with the clay and a proportion of lime is effected by grinding in a pug-mill. The mass is then rolled into thin sheets and dried in a rotating retort, as in Ransome's process of cement-making.

NEW APPLICATIONS FOR PATENTS.

Oct. 12.—14,663, J. Rogers, Sypohn Cisterns or Water Waste Preventers.—14,681, J. Tollerton, Fireproof Curtains for Theatres, &c.—14,686, W. Moore, Smoothing Irons.

Oct. 13.—14,724, L. Wilson, Parquetry and other similar Composite, Wood, and Artificial Wood Surfaces.—14,733, A. Robb, Stonemasons' Points and Chisels, Double Pointer and Chisel Holder.—14,734, B. Ru-sell, Air Inlet Ventilator. — 14,746, J. Youngson, Sash Fastener.—14,750, C. Waxin and A. Clery, Cement or Artificial Stone.

Oct. 15.—14,786, J. Broadhurst, Oven or Kiln for Pottery, &c.—14,806, A. Duff, Drain Pipes.

Oct. 16.—14,853, G. Pankhurst, Brick, Tile, or Slab for Building Purposes.—14,870, T. Kromer, Keys for Doors and Other Locks.

Oct. 17.—14,941, A. Gauge, Electrical Burglar Alarms.

Oct. 18.—14,956, A. Bremner, Combined Latch and Bolt.—14,957, T. Sanders, Sash and Casement Fasteners.—14,963, E. Cox-Walker and A. Swinton, Electric Bells, &c.—14,968, W. Stead, Constructing and Suspending the Vertical Sliding Sashes of Windows.—14,985, R. Hutchinson, Electrical Pile-Drivers.—14,990, J. Colton and J. Lambert, Glass Mosaic Work.—14,998, A. Rost, Chimney Flues.

PROVISIONAL SPECIFICATIONS ACCEPTED.

12,111, T. Gahan, Ventilating Screens for Windows.—12,533, J. Balbirnie, Fireplaces, Grates, &c.—12,685, A. Spaull and C. Callan, Window-sash Fastenings.—12,715, O. Wright, Charging Syphons for Flushing Water-closets.—12,722, J. Finnie, Weather-bar for Doors. — 12,924, J. Bradshaw, Chimney Pot or Top.—12,984, G. Cumpston, Preventing the Spread of Fire in Buildings.—13,170, J. Kaye, Opening and Closing Fanlights.—13,244, T. Knowles, Mantelpieces.—13,305, A. Boult, Wood-Planing Machines. — 13,327, H. Waddington, Draught-Preventers for Doors or Windows.—13,344, W. Youlten, Sliding Window-sashes.—13,525, W. Ralston, Wall-papers.—13,526, J. Twitchin, Convertible Window-sashes.—13,585, J. Coulter, Building Block or Brick.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

14,384, R. and W. Hocking, Water-closets.—16,976, S. Jones and R. Roberts, Tenoning or Mortising Machines. — 17,993, J. Winterflood, Chimney and Ventilating Cowls.—3,664, D. Bacon, Wood-Turning Machinery. — 9,556, J. Holroyd, Construction of Faïence or Glazed Terra-cotta Mantelpieces, &c.—12,709, H. Lake, Door Hinges.—12,758, H. Lake, Circular Saws, &c.—13,318, C. Anderson, Burglar Alarm.—13,430, C. Merchant, Corols for Ventilators and Chimneys.—13,444, N. Morris, White Lead.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

Oct. 15.

By Graves & Son.

Hyde Park—9 and 10, Portsea-place, 28 years, ground-rent £15. 10s. £1,060
9, Alexander-street, 61 years, ground-rent £9 700

By E. Wood.

Shepherd's Bush—52, Uxbridge-road, 20 years, ground-rent £5. 5s. 380
Kilburn—113, 115, and 117, Canterbury-road, 69 years, ground-rent £22. 10s. 800
Dorset-square—60, Boston-place, 32 years, ground-rent £4. 4s. 205
Hackney—10A. 10, and 11, Tudor-grove, 42 years, ground-rent £9 425
Bromley-by-Bow—83, Marner-street, 38 years, ground-rent £2. 13s. 6d. 130

By H. Hooper.

Walthamstow, East Avenue—"Lansdowne Villa," freehold 305
Woodford—1, 2, and 3, Violet-road, freehold 590

October 16.

By Weston & Son.

Peckham—8 and 10, Hanover-street, 35 years, ground-rent £15 510

By Worsfold & Hayward.

Shadwell—10, 11, and 12, Milk-yard, freehold 750
16 to 20, Star-street, freehold 800

By Rogers, Chapman, & Thomas.

North Kensington—104 and 109, Wornington-road, 87 years, ground-rent £15 435

By Fuller & Fuller.

Holloway—52, Queensland-road, 45 years, ground-rent £5 115
Stratford—19 to 25A, Maryland-street, freehold 630

By H. Rutley.

Teddington—5, Orleans-terrace, 91 years, ground-rent £7. 10s. 310
Kentish Town—10, Grafton-street, 57 years, ground-rent £7 260
Barking-road—"The Samson's Arms," 96 years, ground-rent £5 300
Old Kent-road—30, Odell-street, 93 years, ground-rent £15 665
Acton Green—2 and 3, Cambridge-villas, 93 years, ground-rent £10 250
Somers Town—5, Sidney-street, 32 years, ground-rent £12. 12s. 225
Dorset-square—25, 26, and 27, Edward-street; 5 and 9, Boston-mews; and 2, Milton-place, 32 years, ground-rent £31. 5s. 9d. 1,160
Hampstead-road—15 Williams'-mews, 25 years, no ground-rent 190

Oct. 17.

By Higgins & Son.

Bayswater—54 and 56, Porchester road, 56 years, ground-rent £16 2,000
Dorset-square—4, Balcombe-street, 51 years, ground-rent £8. 15s. 815

By Norman & Son.

East Bedfont—Freehold cottage, and 4a. 2r. 23p., and timber 1,312
Copyhold plot of land, 2a. 0r. 25p. 80
An enclosure of land, 6a. 0r. 28p. 226
Two cottages and a plot of land, freehold 200
Enclosures of land, containing 107a. 1r. 2p. 4,700

By P. Matthews.

West-green—"The Woodlands," and 1a. 1r., freehold 1,800

Oct. 18.

By Newbon & Harding.

Canonbury—1 and 3, Northampton-park, 37 years, ground-rent £10 855

By J. G. & A. Prevost.

Limehouse—59, Three Colts-street, freehold 280
Victoria Park—100, Cadogan-terrace, freehold 260
St. George's-in-the-East—2, Chandler-street, 12 years, ground-rent £24 50
Bromley-by-Bow—4, Thomas-street, 57 years, ground-rent £2 50
Bethnal Green—95, Cambridge-road, freehold 6 0
97, Cambridge-road, freehold 800

Oct. 19.

By Baker & Sons.

Barking—7, Broadway, freehold 1,100
49 to 55 odd, North-street, freehold 780
57, North-street, freehold 330
Westbourne Park—An improved ground-rent of £40, term 71 years 600
Hornsey—"The Hornsey Laundry," freehold 500
A plot of freehold land adjoining 250

MEETINGS.

Monday, October 29.

Society of Antiquaries of Scotland (*Rhind Lectures in Archæology*).—Mr. R. Munro, M.A., on "The Lake Dwellings of Europe," V. 4 p.m.

Liverpool Architectural Society.—Opening Address by the President (Mr. E. Kirby). 7 p.m.

Wednesday, October 31.

Liverpool Engineering Society.—Mr. R. S. Wyld, Junr., on "The Laying of Large Mains." 8 p.m.

Society of Antiquaries of Scotland (*Rhind Lectures in Archæology*).—Mr. R. Munro, M.A., on "The Lake Dwellings of Europe," VI. 4 p.m.

Friday, November 2.

Architectural Association. — Mr. J. A. Gotch, on "Elizabeth and Victoria." 7.30 p.m.

Miscellanea.

A Cathedral for Pretoria.—The Bishop of Pretoria has again sailed for his distant diocese. He has taken with him a set of plans for his Cathedral of St. Albans, designed by Mr. William White, F.S.A. It may be a long time before the whole of the structure can be carried out; but his desire is to commence a small portion well rather than to aim at a completed work of inferior character. Probably nothing more will be attempted at present than two or three bays of nave and aisles added on to the east end of the existing temporary building, which would be used for a time as a chancel. The plan is cruciform, with semi-apses to chancel and transepts. The chancel apse is arcaded, with an ambulatory connecting the two chancel aisles, which also are apsidal, and which form the vestries and site for organ. The nave walls, with clearstory, are 40 ft. high. The extreme dimensions are 195 ft. by 80 ft. The building will be chiefly of brick, but with stone columns, caps, and bases of a very simple form, on account of the great cost in working so hard a material. It is proposed to cover the roofs with sheet iron, which is much used in the colony.

The English Iron Trade.—The English iron market continues very steady, on the whole, there being a good general demand, which for some products is rather brisk for both finished iron and steel. The same might be recorded of pig-iron if business were not somewhat retarded through makers being disinclined to bind themselves forward on account of the expected and growing dearness of fuel, while the partial settlement of the wages dispute in the coal trade, in favour of the miners, has imparted an additional stiffness to the pig-iron market. In Scotch warrants there is a firmer feeling, and makers' prices are unchanged. Cleveland iron, although 6d. a ton lower on the week, is very firm at 34s. 6d., its present prompt price. Bessemer iron, on the contrary, is 6d. a ton higher. The tendency for pig-iron in Lancashire and Staffordshire is upwards. Manufactured iron, in consequence of a well-sustained demand, is strong, and tending higher, and this feeling has found expression in Scotland by an advance of 2s. 6d. a ton for bars, and of 2s. 6d. to 7s. 6d. for sheets. The tone of the steel market is excellent, there being a movement towards higher prices. Shipbuilders are receiving additional orders, but the increased rates asked for new tonnage have somewhat checked the placing of fresh orders. Engineers are well supplied with work at, on the whole, satisfactory prices.—*Iron.*

The Tivoli Concert-hall in the Strand. The memorial-stone of the Tivoli Concert-hall and Restaurant was laid on the 18th inst. by Mr. H. J. Leslie, chairman of the company, by whom the enterprise is promoted. The new Tivoli will have a prominent position in the Strand, and a frontage of about 90 ft., the whole of the buildings being of fireproof construction. The entrances to the concert-hall are on three sides of the building. The area is entered by a broad staircase, and is provided with three exits. The balcony is entered from the grand entrance-hall, and has two exits. The first balcony is approached by a wide staircase, and also has two exits, the exit accommodation being equal to over 5,000 persons, whereas the actual seating accommodation is estimated at about 1,000, and the promenade, lounges, &c., about the same. On each tier ample space has been set apart for promenade purposes. The staircases throughout are composed of Eureka concrete. A sliding roof forms a portion of the system of ventilation, besides which there are exhausts fitted throughout the buildings. The interior decoration is Indian in style. The platform or stage is fireproof, and any wood used is coated with fireproof paint. Sprinklers on the non-automatic system have been placed over the stage, and are controlled by valves fixed near the artists' door, where is also placed a hydrant, the whole being under the control of the fireman. The whole building is provided with hydrants. The restaurant consists of a buffet on the Strand level, the palm-room on the first floor, the Flemish-room on the second floor, and the private dining-rooms on the floor above, with the kitchens and offices on the top floor. The electric light will be used throughout the entire buildings, though gas will be laid on in case of emergency. The whole of the restaurant will be heated by hot water. Mr. Walter Emden is the architect, and Messrs. Kirk & Randall are the contractors.

Sales of Building Land at Southend and Herne Bay.—There seems to be a very active demand for the building sites on the property known as the Sea View Estate, upwards of twenty acres in extent, situated on high ground about a mile and a half to the westward of Southend, and which is now being laid out for building purposes. About a month since, the first portion of the estate, containing 185 lots, was disposed of in a marquee on the estate, the several lots realising from £10 to £20 each, and producing a sum of £2,600. Last week a second sale of the sites took place at the Alexandra Hotel, Southend, when there was a numerous attendance, the number of plots offered being sixty. There was again an active demand, all the sites, of the same size as those sold at the previous sale, being sold at an average of 25*l.* each, several shop plots fetching 30*l.* each. After the plots advertised were disposed of, a purchaser at the former sale requested the auctioneer to sell some plots he had purchased, and these changed hands at a profit of 50 per cent. The proceeds of the sale amounted to 922*l.*, making with the first sale, an aggregate of upwards of 3,500*l.* Mr. H. Iles conducted the sale.——On Monday night Mr. Iles submitted 126 plots for sale on the Hampton-on-Sea Estate, near Herne Bay. Most of them were sold at prices ranging from 12*l.* to 15*l.* each.

New Metropolitan Electric Light Company's Offices. — The Metropolitan Electric Lighting Company, which has recently been formed with the view of lighting various parts of the metropolis by electricity, are about to erect new offices at their central supply station. They have just purchased a site for the purpose on the Surrey side of Waterloo Bridge, immediately adjoining the large steam flour mills of Mr. Seth Taylor. The new buildings are to be commenced immediately.

Robert Boyle & Son (Limited).—The directors of Robert Boyle & Son (Limited), ventilating engineers, London and Glasgow, have resolved, subject to audit, to recommend a dividend of 12 per cent., free of income-tax, on the ordinary shares of the company for the year ending September last, after placing to the reserve fund one-sixth of the profits earned, and carrying forward 1,241*l.* 10s. 4d.

The English Villa System in Copenhagen. — A company has been formed in Copenhagen for erecting villas and cottages on the English system in the suburbs of Copenhagen. The company is supported by several leading Danish architects, and has a capital of 10,000*l.*

Properties for Sale at the Mart.—On Thursday, Nov. 29, Lowfold, Wisborough-green, near to Pulborough, Sussex, together with an adjoining farm of sixty-six acres. Lowfold embraces nearly 280 acres, along the river Arun, and in the midst of Lord Leconfield's hunt. The house commands a fair view of the Southdowns across the vale. On Tuesday, Nov. 6, Crofton House, Crofton, within two miles south-east of Titchfield, Hants, and near to the valley of the Aire. The pleasure-grounds and meadow-land extend over fifty-six acres. In the chancel of St. Peter's Church, Titchfield, —which dates from 1243, and of which the northern portion was built by William of Wykeham,—a fine monument was erected over the tomb of Sir Thomas Wriothesley, Earl of Southampton, who was Chancellor to Henry VIII. On Tuesday, 30th inst., Rotherfield Hall, Sussex, a fine old manor-house, built of stone, near to Crowborough and Tunbridge Wells. The Early English Church here, standing 600 ft. above the sea, is dedicated to St. Denis, and marks the site of a monastery that was founded in A.D. 800 by some monks from St. Denis, near to Paris, on land given to them by Beorhtric, last over-lord of Wessex. The east window in the chancel was designed, we understand, by Mr. Burne Jones. In London: Nos. 129 and 131, Regent-street, west side, let at rents of 300*l.* and 350*l.* respectively, with No. 201, Regent-street, and No. 67, Conduit-street, leased to Messrs. Cramer & Co. at 510*l.* a year, until next Midsummer, the whole held under the Crown for about thirty-three years to come. The lease and goodwill of the well-known "Groom's" coffee-house at No. 16, Fleet-street, where, next door to the "Rainbow" tavern, the late Mrs. Groom and her predecessors have been established since the end of the seventeenth century. The premises are held on a lease for sixty-one years from 1854, at a ground rent, covering insurance, of 55*l.* 10s. per annum. And on Tuesday, 13th November, by Messrs. E. & H. Lumley, No. 146, Piccadilly, next door to Lord Rothschild's house, at Hyde Park Corner; held from the Crown for a term whereof sixty-seven years are unexpired.

The Stoppage of the Ribble Works.—The stoppage of the Ribble and dock works at Preston, owing to the failure of the Parliamentary Bill of last session, has caused the most disastrous consequences in the town. The Corporation, however, are preparing to promote another Bill in the Session of 1889, and on the 19th inst. passed a resolution which, in the evening, received the unanimous sanction of owners of property and ratepayers at a very numerous meeting which was held in the public hall, at which the Mayor presided. The resolution was in the following terms:—"That it is expedient to promote, and the consent of the Council is hereby given for the promotion, in Parliament in the session of 1889 a Bill for the following, or some of the following, among other purposes, that is to say, to authorise and empower the Corporation to borrow further monies for completing the dredging of the river Ribble, in accordance with the estimate laid by them before the Committee of Parliament in the session of 1888, including the providing of all plant necessary for that purpose, and for completing the docks and works as comprised in the contract between the corporation and Mr. T. A. Walker, dated September 20, 1884, and for this equipment of the said dock and works in accordance with the limitation suggested by Mr. Abernethy, C.E., in his report dated May 30, 1888, or as near thereto as practicable, and for the construction of a graving-dock; that the costs and expenses of promoting such Bill be charged to the Harbour Revenue and Borough Fund account." On going over the unfinished works a desolate scene is presented to view, which, however, must remain until the result of the Bill now to be applied for is known. It appears that the chief causes which have led to the present misfortunes are to be found in the differences amongst the engineers with respect to the navigable channel to the sea. The engineers on the part of the Corporation contend that the Gut Channel is the best, whilst Mr. Abernethy contends that the north Channel outlet would be the only one available.

Peel, Isle of Man.—A large clock and tune-playing carillon has just been erected in the new church here by John Smith & Sons, Midland Clock Works, Derby. It has been carried out to the designs of Lord Grimthorpe, and is stated to be the largest work of the kind in the island.

The Sanitary Condition of Rotherhithe.—The Home Secretary having ordered an inquiry into the sanitary condition of Rotherhithe, Mr. Cubitt Nicholls and Mr. Shirley F. Murphy, the appointed Commissioners, on the 19th inst. opened their inquiry at the Board-room of the parochial offices, Deptford Lower-road, Rotherhithe. The Mansion-house Council on the Dwellings of the Poor was represented by Mr. Reader Harris, of the Parliamentary Bar; Dr. Louis Parkes, medical adviser to the Council; the Rev. G. M'Cree, and Mr. Hodge; while Mr. J. Stokes and other officials of the Vestry represented the parochial authorities. Mr. Nicholls, in opening the proceedings, said complaint had been made to the Home Secretary of the sanitary condition of Rotherhithe, and he thought it best to first hear what the representative of the Mansion-house Council had to say on the subject. Mr. Harris, in his address, said the Council did not appear there as prosecutors but as friends, hoping to assist and aid the Vestry in obtaining definite steps to put the parish of Rotherhithe in a sanitary condition. The object of the Council was to improve the dwellings of the people, also, at the same time, to improve the sanitary law of the metropolis. He might mention that the Public Health Act, which was so beneficial outside the metropolis, did not apply within. This inquiry was instituted not so much to amend the law as to enforce the existing law, and so improve the houses of the poor. Their first complaint was that the existing sanitary law was not enforced by the authorities; and, secondly, in this parish there was only one medical officer and one sanitary inspector, and neither of these gentlemen devoted the whole of his time to the duties. The Mansion-house Council had been instrumental in bringing about three inquiries—viz., Clerkenwell, Mile-end, and Bethnal-green, and the vestries of these parishes had since acknowledged the benefits derived from those inquiries. The contention of the Council in regard to this parish was that it was in an insanitary condition. In October and December last year the Council had examined 1,000 houses in this parish, and these were again examined in March and September last. In March it was found that out of this number 711 houses had unpaved or badly-paved yards, 89 houses had untrapped or defective gullies, and in 581 houses there was no water supply to the closets. It was also found that 201 houses had no dust-bins. After mentioning other defects, Mr. Harris said such a condition of insanitation was deplorable, and the vestry had power to remedy such a state of things. In 1881 there were 4,847 houses and a population of 36,000 persons in the parish, so it would be easily seen that it was practically impossible for one medical officer and the sanitary inspector to cover this large area. The death-rate, according to the reports of the medical officer of the parish, had risen in 1885 and 1886 from 17·9 to 23 per 1,000. In the course of a discussion the Surveyor admitted they had never enforced the supply of water to the closets in the poorer parts of the parish. It was decided that before the next public inquiry was held and evidence taken, the Commissioners would examine the condition of the houses for themselves.—*Times.*

Electric Lighting in the City —At last week's meeting of the Court of Common Council, Mr. Pannell, chairman of the City Commission of Sewers, in answer to Mr. Stewart, said about six or seven applications from good companies had been received by the Commission for the electric lighting of either the whole or a part of the City area. These had been referred to the Streets Committee for consideration. Meanwhile, the Solicitor and the Engineer to the Commission, and Mr. Preece, F.R.S., of the General Post Office, had been requested to prepare a scheme on which could be based forms of tender which might be publicly advertised with a view, as soon as possible, to obtain the advantages of electric lighting in the City.

The New Swedish Houses of Parliament —The committee appointed for selecting a design for the new Houses of Parliament in Stockholm has decided upon giving prizes for the ten best designs sent in, and that the successful architects then amend these designs in conformity with the general plan adopted by the committee for the new building.

Cities of Northern Italy.—On Saturday, the 20th inst., Mr. Edgar H. Selby, A.R.I.B.A., delivered a lecture at Lewisham on some of the principal cities of Northern Italy. The lecture was illustrated by numerous original drawings.

Drawing Instruction in Board Schools—Last week, at the meeting of the School Board for London, the debate was resumed on the first report of the special committee on the subjects and modes of instruction in the Board's schools. Mr. Bousfield (chairman of the committee) moved that the Board should authorise the appointment of an officer whose duties should be to give instruction in, and to organise, the methods of teaching mechanical and geometrical drawing. The resolution gave rise to a long discussion, the contention in its favour being that the appointment of an officer in accordance with the terms of the report was necessary in order that drawing might be taught systematically. Mrs. Westlake urged that drawing should be made obligatory in all our elementary schools, both for boys and girls. Much attention was being given to the subject on the Continent, and she thought a practical advance would be made in this country by the appointment recommended in the resolution. Mr. Heller maintained that the majority of the teachers in the employ of the Board were fully competent to teach drawing. The motion was eventually negatived by 26 to 15.

PRICES CURRENT OF MATERIALS.

TIMBER.	£.	s.	d.	£.	s.	d.
Teak, E.I. ..... load	8	0	0	12	10	0
Sequoia, U.S. ..... foot cube	0	2	3	0	3	0
Birch, Canada ..... load	2	15	0	4	15	0
Fir, Dantsic, &c.	2	0	0	4	0	0
Oak ,, ...	2	0	0	4	10	0
Canada	4	0	0	6	10	0
Pine, Canada red	2	10	0	3	10	0
,, yellow	2	10	0	4	0	0
Lath, Dantsic ..... fathom	3	10	0	5	0	0
St. Petersburg	5	0	0	6	0	0
Wainscot, Odessa, crown	2	10	0	3	0	0
Deals, Finland, 2nd and 1st...std.	9	0	0	10	0	0
,, 4th and 3rd	7	0	0	9	0	0
Riga	7	0	0	8	0	0
St. Petersburg, 1st yellow	9	10	0	15	10	0
,, 2nd ,, ...	9	0	0	10	0	0
,, white	7	10	0	10	10	0
Swedish	7	10	0	16	10	0
White Sea	8	10	0	17	10	0
Canada, Pine, 1st	16	0	0	25	10	0
,, ,, 2nd	10	10	0	17	10	0
,, ,, 3rd, &c.	7	10	0	10	10	0

TIMBER (*continued*).	£.	s.	d.	£.	s.	d.
Canada, Spruce, 1st	9	0	0	10	0	0
,, 3rd and 2nd	7	0	0	8	10	0
New Brunswick, &c.	6	10	0	8	0	0
Battens, all kinds	5	10	0	12	0	0
Flooring Boards, sq., 1 in., prepared, First	0	11	0	0	14	6
Second	0	8	0	0	10	9
Other qualities	0	5	6	0	7	9
Cedar, Cuba ..... foot	0	0	3½	0	0	3½
Honduras, &c.	0	0	3½	0	0	3½
Australian	0	0	2	0	0	3
Mahogany, Cuba	0	0	4½	0	0	5½
St. Domingo, cargo average	0	0	4½	0	0	5½
Mexican ,, ...	0	0	4	0	0	4½
Tobasco ,, ...	0	0	4½	0	0	5½
Honduras ,, ...	0	0	4½	0	0	5½
Box, Turkey ..... ton	5	0	0	12	0	0
Walnut, Italian ..... foot	0	0	4½	0	0	6
METALS.						
Iron—Bar, Welsh, in London...ton	4	17	6	5	0	0
,, ,, at works in Wales ...	4	7	6	4	10	0
,, Staffordshire, in London ...	5	15	0	7	0	0
Copper—						
British, cake and ingot..... ton	80	0	0	81	0	0
Best selected	81	10	0	82	10	0
Sheets, strong	86	0	0	88	0	0
Chili, bars	78	15	0	0	0	0
Yellow Metal ..... lb.	0	0	7½	0	0	7½
Lead—						
Pig, Spanish ..... ton	13	0	0	13	5	0
English, common brands	0	0	0	0	0	0
Sheet, English	14	5	0	14	10	0
Spelter—						
Silesian, special ..... ton	19	2	6	19	5	0
Ordinary brands	18	17	6	19	0	0
Tin—						
Banca ..... ton	104	0	0	0	0	0
Billiton	103	0	0	0	0	0
Straits	103	0	0	0	0	0
Australian	103	0	0	0	0	0
English Ingots	105	0	0	0	0	0
Zinc—English sheet ..... ton	22	10	0	23	10	0
OILS.						
Linseed ..... ton	20	0	0	20	5	0
Cocoanut, Cochin	26	10	0	27	10	0
Ceylon	25	5	0	25	10	0
Palm, Lagos	24	0	0	24	10	0
Rapeseed, English pale	30	15	0	31	0	0
,, brown	29	10	0	0	0	0
Cottonseed, refined	22	5	0	22	10	0
Tallow and Oleine	19	0	0	45	0	0
Lubricating, U.S.	5	0	0	6	0	0
,, refined	7	0	0	12	0	0
Turpentine—						
American, in casks ..... cwt.	1	13	0	1	13	3
Tar—						
Stockholm ..... barrel	1	1	6	0	0	0
Archangel	0	11	0	0	11	6

CONTRACTS AND PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Kerbing and Tarpaving Footpaths, &c.	Lewisham Board of Wk	*Official*	Oct. 30th	ii.
Opening-up Pavement Lights, &c.	Whitechapel Union	Bruce Capell	do.	ix.
Additional Tanks, &c., at Sewage Works	Billericay U R S A.	*Official*	do.	ii.
Yellow Deal Blocks, Thames Ballast, &c.	Chelsea Vestry	G. R. Strachan	do.	ii.
Wrought-Iron Girders, &c., for Bridges	Midland Railway Co.	*Official*	Nov. 2nd	ii.
Engine Shed at Derby	do.	do.	do.	ii.
Making-up Roads	Friern Barnet Lcl. Brd.	G. Clarke	do.	ii.
Sluice Valves	Calcutta Corporation	J. Quick & Son	do.	ii.
Pipes and Castings	do.	do.	do.	ii.
Removal of Fine Ash and Clinkers	St Mary's (Battersea) Vestry	J. T. Pilditch	Nov. 3rd	ii.
Drainage and other Sanitary Works	Steyning Union	Ellice-Clark	Nov. 5th	ix.
Gas Mains, Road Lamps, &c., Kent	Met. Asylums Board	A. & C. Harston	do.	ix.
Supply of Gravel, Purchase of Road Refuse, &c.	Paddington Vestry	*Official*	do.	ix.
Kerbing, Paving, &c.	Bromley Local Board	do.	Nov. 6th	ix.
Works at Workhouse and Offices	Bethnal Green Guardians	A. & C. Harston	do.	ix.
Stoneware Glazed Socketed Drain-Pipes	Enfield Local Board	W. Kitteringham	Nov. 7th	ix.
New Brick and Pipe Sewer, &c.	St. Marylebone Vestry	*Official*	Nov. 8th	ix.
Sewering and Making-up Roads, Footpaths, &c	Beckenham Local Bd.	G. B Carlton	Nov. 12th	ii.
Sanatorium, Halifax		John Ely	do.	ix.
Road-making and Paving Works	Willesden Local Board	O. Claude Robson	Nov. 13th	ix.
Offices, &c.	Fulham Union	H. Saxon Snell & Son	Nov. 15th	ix.
Water Tower, Wrought-Iron Tank, &c.	Southwold Waterworks Company, Limited	Urban A. Smith	Nov. 19th	ix.
Town Hall, Additions, &c.	Northampton Cor.	*Official*	Nov. 20th	ii.

PUBLIC APPOINTMENT.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Borough Surveyor	Welshpool Corporation	90*l.*	Nov. 13th	xiv.

TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *Noon on Thursdays.*]

BLACKHEATH.—For erecting stables and coach-houses at Combe Farm-lane, Blackheath, for Mr. James Murray. Mr. John James Downes, architect, 183, Lewisham High-road:—

Messrs. W. H. Lorden & Son £1,600 0 0

BOVINGDON (Herts).—For repairs, &c., at Baptist Chapel, Bovingdon, Herts. Mr. George H. Green, architect, Chesham.

Ed. Horn, Hemelhempsted, Herts	£113	0	0
Job Wright, Chesham, Bucks	98	0	0
Saml. Monk, Hemelhempsted, Herts*	74	18	0

* Accepted.

BATTERSEA.—For the erection of stables, harness-room, &c., at the dust destructor dépot, Culvert-road, for the Parish of Battersea. Mr. J. T. Pilditch, Surveyor:—

C. Beach	£3,045	2	5
Whitbread	2,895	0	0
Holloway, Bros.	2,785	0	0
Higgs	2,766	0	0
Grist	2,758	0	0
Nightingale	2,754	0	0
Havlock	2,713	0	0
Parker	2,699	0	0
J. Holloway	2,685	0	0
Sharien	2,662	2	5
Howard	2,630	10	0
Street & Son	2,609	10	0
Marsland	2,584	0	0
Richardson	2,534	0	0
Bricknell	2,519	0	0

CATERHAM.—For additions to Tupwood Lodge, Caterham Valley, Surrey. Mr. Alfred Conder, architect, Palace Chambers, Westminster. Quantities by Mr. Wm. Dunk, 36 and 37, Leadenhall-street, E.C.:—

G. S. S. Williams & Son	£4,590	0	0
S. J. Jerrard	4,469	0	0
Jas. Morter	4,373	0	0
Colls & Son	4,333	0	0
E. Lawrance & Sons	4,141	0	0
Jas. Holloway	4,140	0	0
J. Woodward	4,070	0	0
T. Rider & Son	3,998	0	0
J. & J. Greenwood (accepted)	3,777	0	0

FULHAM.—For making up, paving, &c., of Marville-road, Fulham, for the Vestry. Mr. J. P. Norrington, surveyor:—

Adams	£384	0	0
Nowell & Robson	347	0	0
Tomes & Wimpey	295	0	0
Coat	291	0	0
Trehearne (accepted)	263	0	0

HARTLEPOOL.—For sewering, macadamising, flagging, channelling, kerbing, &c., in Moor-street and Brougham-street, Hartlepool, for the Corporation of Hartlepool. Mr. H. C. Crummack, Assoc. M. Inst. C.E., Borough Engineer:—

J. Bulmer, Hartlepool (accepted) £881 14 0

[Borough Engineer's estimate, £910.]

HEREFORD.—For erecting Victoria Jubilee Eye and Ear Hospital. Mr. E. H. Lingen Barker, architect:—

Treasure & Son, Shrewsbury	£2,198	10	0
Yates, Shifnal	2,085	0	0
Kimberley, Banbury	2,034	0	0
Dowland, Pontrilas	2,020	0	0
Stephens & Bastow, Bristol *	2,000	0	0
Kingerlee, Oxford	1,987	0	0
Williams, Knighton	1,968	6	0
D. C. Jones & Co., Gloucester	1,840	0	0
Watkins, Hereford	1,778	0	0
Davies, Shrewsbury	1,595	0	0

* Accepted.

HOUNSLOW.—For the erection of the new Town-hall. Mr. H. O. Cresswell, architect:—

W. Hogbin	£6,745	0	0!
T. J. Messum	4,900	0	0
G. Danels	4,850	0	0
A. J. & B. G. Hanson	4,829	0	0
Lansdown & Co.	4,800	0	0
B. E. Nightingale	4,780	0	0
J. Dorey	4,773	0	0
Oldridge & Sons	4,685	0	0
W. Wisdom	4,600	0	0
H. W. Hiscock	4,555	0	0
W. H. Brown	3,989	0	0!

IVY HATCH (Kent).—For residence, Ivy Hatch, Kent. Mr. Edwin T. Hall, architect, 57, Moorgate-street, London. Quantities by Messrs. Evans & Deacon, 1, Adelaide-street, W.C.:—

Foster & Dicksee	£6,789	0	0
Langdale & Hallett (accepted)	6,500	0	0

LIVERPOOL.—For erecting new furniture warehouse, &c., at No. 69, Seel-street, for Mr. J. H. Unsworth. Mr. W. Graham Lloyd, architect:—

John Tancred, 86, Seel-street * £400 0 0

* Lowest estimate (accepted).

LONDON.—For alterations and additions to premises, College Hill and College-street, E.C., for Messrs. Tudor & Sons. Messrs. Stock, Page, & Stock, architects:—

Harrison & Spooner	£1,824	0	0
Rider & Son	1,648	0	0
Stimpson & Co.	1,580	0	0
Pritchard & Co.	1,565	0	0
J. & J. Greenwood	1,368	0	0

LONDON.—For alterations, &c., required to be done to the "Union," Panton-street, Haymarket, W., for Mr. J. Pierpoint. Mr. H. I. Newton, architect, 17, Queen Anne's-gate, Westminster, S.W.:—

Godden, S., Bryanston-square	£309	0	0
Lamble, S. R., Kentish-town	295	0	0
Kellaway, W. L., Islington	293	0	0
Burman, H., & Sons, Kennington-park	263	0	0
Smith, W. J., & Son, Belgrave-square,*	256	0	0

* Accepted.

LONDON.—For the erection of two kiosks for the International Hygienic Society. Mr. Christopher M. Shiner, architect, 15, New Broad-street, E.C.

For ground work.

Beevers	£238	0	0
Munday & Son	192	0	0
Adams	171	19	8

For superstructure.

Round	290	0	0

For whole of work.

Benham & Son	690	0	0
Kirk & Randall	440	0	0

LONDON.—For decorative and sanitary work at 37, Randolph-crescent, Maida-vale. Mr. Delissa Joseph, architect. Basinghall-street, E.C.:—

A. W. Hammond	£453	0	0
G. H. Bird	371	5	0
J. Martin	313	17	6
J. Allen & Sons	290	0	0

LONDON.—For work connected with the rebuilding Nos. 37, and 38, Gutter-lane, Cheapside. Mr. Delissa Joseph, architect, 17 and 18, Basinghall-street, E.C.:—

Ironwork.

M. T. Shaw & Co.	£344	10	0
Moreland & Son	336	0	0
Measures Bros. & Co.	302	9	6

Stonework.

G. Seale	£295	0	0
G. Herridge	290	0	0
J. Stowell	280	0	0

NORTHWOOD (Middlesex).—For the erection of dwelling-house, Northwood, Middlesex. For Mr. A. Comper. Mr. Geo. H. Green, architect, Chesham:—

A. T. Wilson, Rickmansworth* £165 0 0

* Accepted.

NORTHWOOD (Middlesex).—For the erection of dwelling-houses at Northwood, Middlesex, for Mr. Jas. Petley. Mr. Geo. H. Green. architect, Chesham, Bucks:—

W. Larter, Harrow Weald, Middlesex	£1,560	0	0
C. F. Kearley, Uxbridge, Middlesex.	1,473	0	0
Brown & Sons, Harefield, Middlesex.	1,175	0	0
Thos. Bonnett, Watford, Herts	1,041	0	0
A. T. Wilson, Rickmansworth*	1,039	0	0

* Accepted.

PECKHAM. — For cleaning, painting, ventilating, plastering, and decorating the interior of St. Luke's Church, Peckham:—

Money Marsland, Wandsworth*	£500	0	0

* Accepted.

RISHTON (near Blackburn).—For the interior decoration of the Church of SS. Peter and Paul, Rishton. Messrs. Simpson & Duckworth, architects, Blackburn:—

Heighway & Son, Manchester*	£200	0	0

* Accepted.

STOKE-UPON-TRENT. — For alterations to the "Wheatsheaf" Hotel, Stoke-upon-Trent. Mr. Edwin Penn, architect. Quantities supplied by the architect:— *Contract No.* 1.

P. Bennion, Longton	£631	0	0
Yoxall & Heath, Stoke	558	0	0
N. Barlow, Stoke	550	0	0
H. Goodwin, Longton	498	15	0
Bradbury Bros., Stoke	471	0	0
G. Harris, Stoke	460	0	0
T. Chatfield, Hanley	450	0	0
G. Hancock, Stoke	449	0	0
J. Breeze, Stoke (accepted)	430	0	0

STRATFORD.—For the erection of manufacturing premises at Stratford, for Messrs. A. Boake Roberts & Co. Mr. Thomas W. Fletcher, architect, 73, Bow-road. Quantities supplied:—

Hayworth & Sons	£1,148	0	0
McCormick & Sons	1,140	0	0
Gregar & Son	1,137	0	0
Norton & Sons	1,077	0	0
G. H. Smith (accepted)	900	0	0

TUNBRIDGE WELLS. — For the erection of six dwelling-houses, in Molyneux Park, Mount Ephraim, Tunbridge Wells. Mr. William B. Hughes, architect, 43, London-road, Tunbridge Wells:—

Charwood Bros.	£10,570	0	0
R. Cox	10,406	0	0
Benley & Co.	9,857	0	0
Holt	9,400	0	0
White & Hemphrey	9,377	0	0
Mansfield & Son	9,250	0	0
G. Stephenson	8,810	0	0
W. J. Wells	8,801	0	0
Strange & Son	8,315	0	0
W. J. Adcock	8,175	0	0
Foster & Dicksee	7,923	0	0
Cornwell & Son	7,900	0	0
Wallis & Son	7,874	0	0
Beach	7,843	0	0
Avard (accepted)	7,479	0	0
Canty	7,457	0	0

WALTHAMSTOW.—For the erection of ten cottages and a shop at Walthamstow. Mr. Christopher M. Shiner, architect, 15, New Broad-street, E.C.

Rowe	£1,400	0	0

WANSTEAD.—For the erection of three shops, stabling, &c., on Rose Cottage-green, for Mr. J. Maughfling. Mr. W. Seckham Witherington, architect, 79, Mark-lane, E.C.:—

Jolliffe, Wanstead (accepted)	£1,575	0	0

WOOD GREEN.—For the erection of St. Mark's Mission Church, Noel Park. Mr. Rowland Plumbe, architect. Messrs. Fowler & Hugman, surveyors:—

	A.	B.
Ashby Bros.	£8,920	£8,600
Messum	8,888	8,248
Nightingale	8,780	8,480
Goodman	8,271	7,785
Catley	8,240	7,664
Woodward	8,116	7,520
Morter	8,079	7,769
James	7,900	7,520
W. Shepherd	7,885	7,465
Dove	7,875	7,825
Kilby & Gayford	7,860	7,635
Treasure & Son	7,648	7,440

A. If screens, gallery front, and seats are in oak.
B. If pitch-pine.

Randolph Mansions, Portsdown-road, Maida Vale.—In the list of tenders for this job, given on p. 293 of our last issue, Messrs. Holliday & Greenwood were erroneously described as of Battersea, instead of Brixton.

TO CORRESPONDENTS.

G. & Co.—S. & W. (should send amounts).—J. B. W. (ditto).—T. C. N.—W. F. R.—G. M. M.—T. W. (thanks: see paragraph on p. 291 of last week's *Builder*).—W. G. S.—J. H.—A. W. R. S.—B. & F.—T. L. W.—E. T. H.—W. A. B. (below our mark).—S. J. M.—H. H.—W. W.—F. S.—F. W. C. (we will inquire).—W. A. C. (an advertisement).—H. D.—C. H.—C. S.—H. J. F. (too late).—W. E. (too late).

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication

We are compelled to decline pointing out books and giving addresses.

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Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY, and for the Front Page by the same Hour on WEDNESDAY.

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Now ready.

READING CASES, { NINEPENCE EACH. By post (carefully packed), 1s.

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HIGH-CLASS JOINERY.

LASCELLES' CONCRETE.

Architects' Designs are carried out with the greatest care.

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WOODEN BUILDINGS.

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CHURCH BENCHES & PULPITS.

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BOX GROUND. | COMBE DOWN.
WESTWOOD GROUND. | STOKE GROUND.

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DOULTING FREESTONE.

THE CHELYNCH STONE. The stone from these quarries is known as the "Weather Beds," and is of a very crystalline nature, and undoubtedly one of the most durable stones in England.

THE BRAMBLEDITCH STONE. Is of the same crystalline nature as the Chelynch Stone, but finer in texture, and more suitable for fine moulded work.

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Greater facilities have been provided for working these quarries, and the stone can be supplied in large quantities at short notice.

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Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 42, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds, and milk-rooms, graneries, tun-rooms, and terraces. [Advt.

Asphalte.
Seyssel, Patent Metallic Lava, and White Asphaltes.
M. STODART & CO.,
Office:
No. 90, Cannon-street, E.C. [Advt.

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LITHOGRAPHERS AND PRINTERS,
Estate Plans and Particulars of Sale promptly executed.
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Can be carried out easily by using our Lamps.

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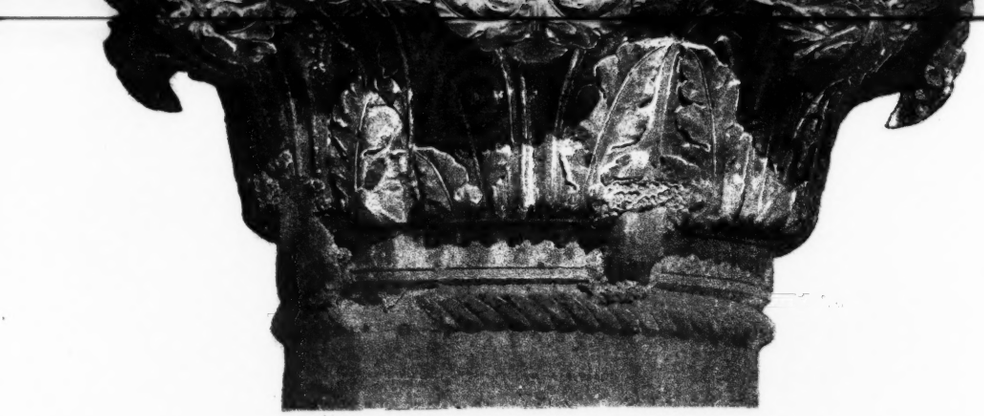
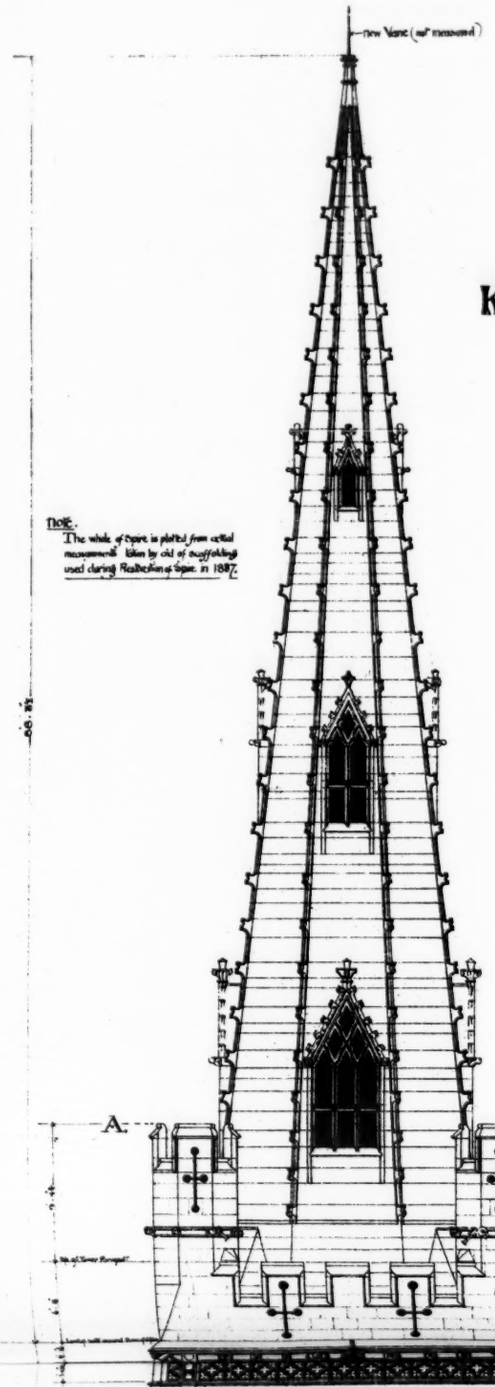
Entirely Self-Contained. Portable. Very Cheap.

F. BRABY & CO., 352 TO 362, EUSTON ROAD, LONDON, N.W.



"INK-PHOTO," SPRAGUE & Co. 22, MARTINS LANE, CANNON ST. LONDON, E.C.

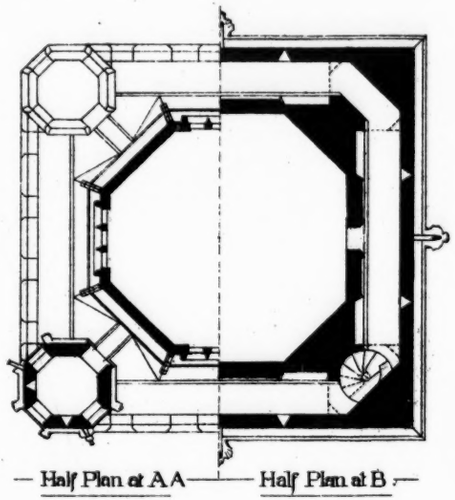
CAPS FROM THE DUCAL PALACE, AND TWO WELL-CURBS: VENICE. (FROM PHOTOGRAPHS.)



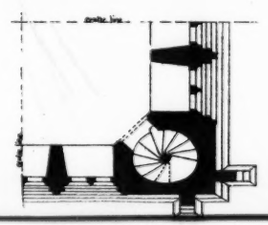
Note.
The whole of Spire is plotted from actual measurements taken by aid of scaffolding used during Restoration of Spire, in 1887.

KETTERING CHURCH. NORTHANTS.

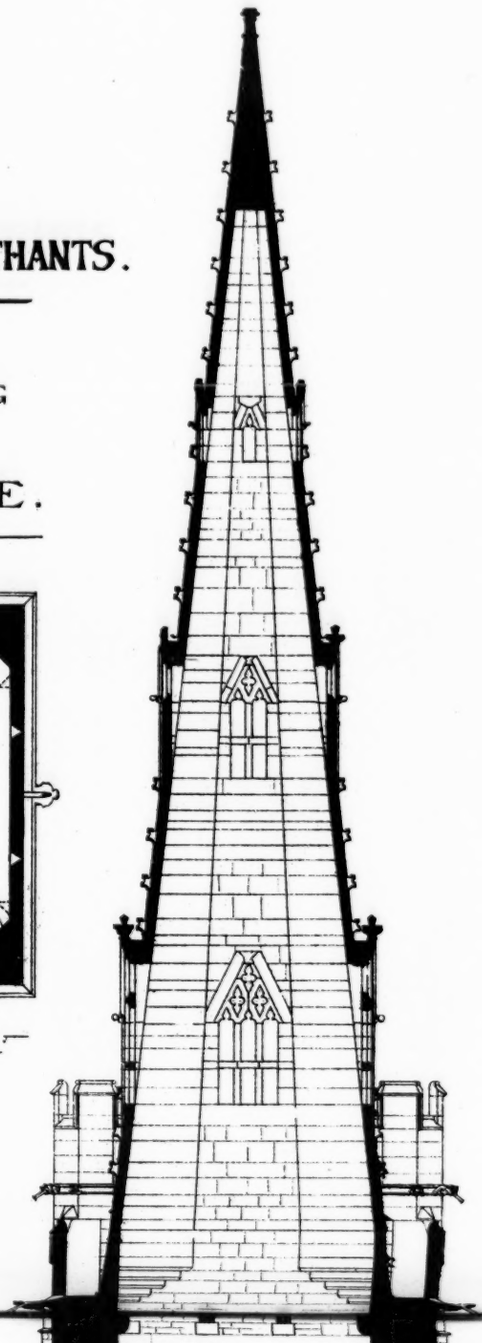
MEASURED DRAWING OF TOWER AND SPIRE.



— Half Plan at A A — Half Plan at B —



— Quarter Plan at C. —



— Quarter Plan at C. —

C.

— Quarter Plan at D. —

D.

Nave Roof.

— Half Plan at E. —

E.

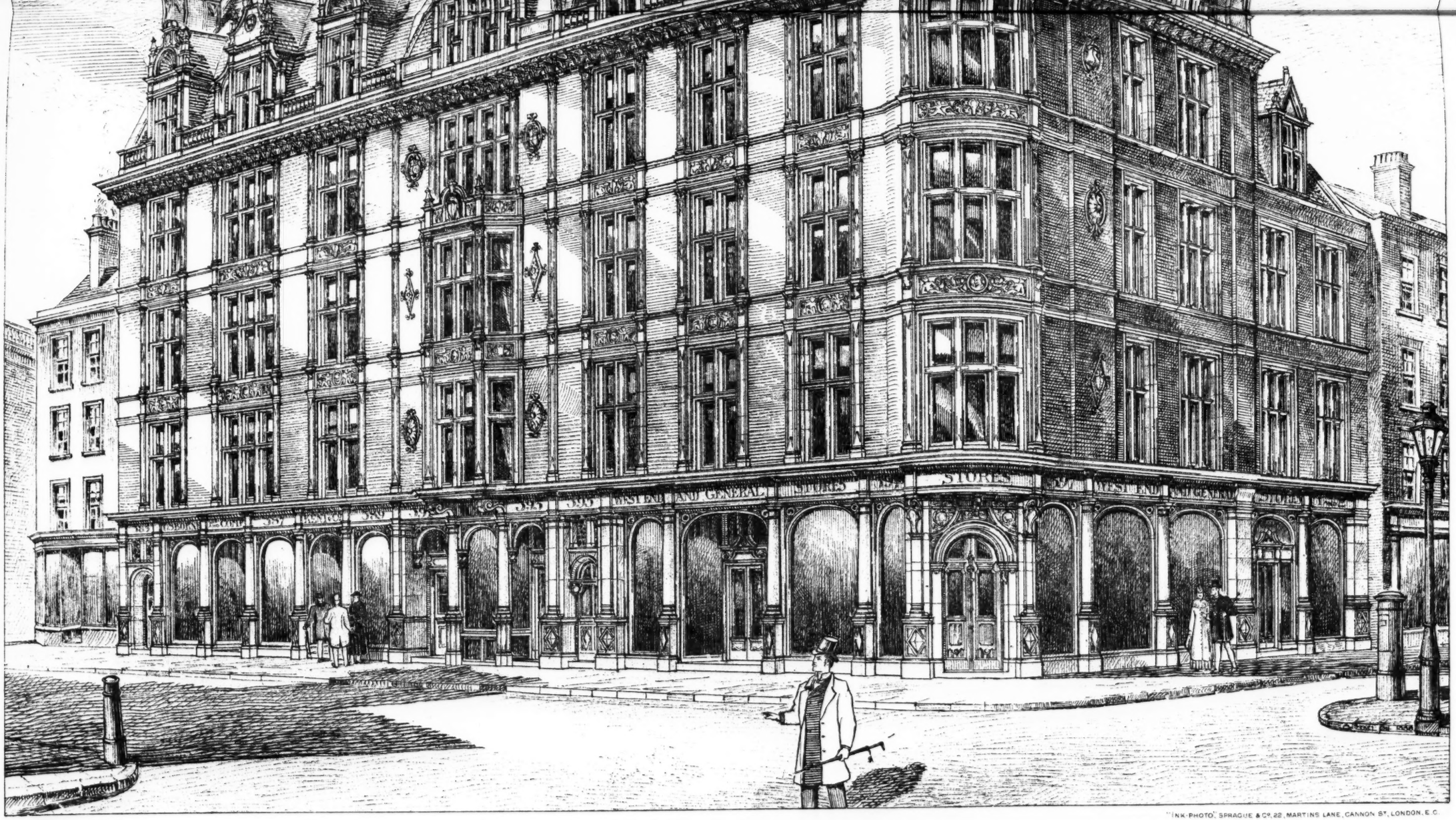
West Elevation.

Scale of Feet.

Section looking North.

Jas Hardman del.
Oct. 1887.

PHOTO-LITHO, SPRAGUE & Co 22, MARTINS LANE, CANNON ST, LONDON, E.C.



SHOPS AND RESIDENTIAL CHAMBERS, 395 & 397, OXFORD STREET.—Messrs. T. Chatfeild Clarke & Son, Architects.

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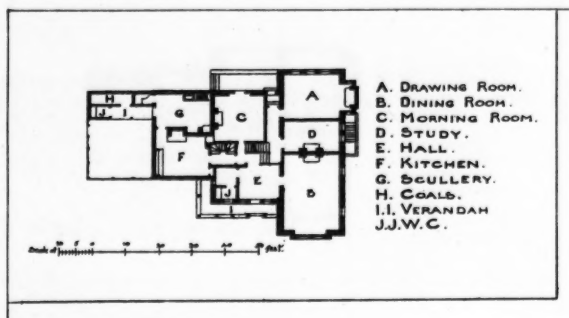
STABLE AND COTTAGES, HEATH HOUSE, BANSTEAD, SURREY.—Mr. Herbert D. Appleton, F.R.I.B.A., Architect.



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RESIDENCE, SUTTON, SURREY.—Mr. Herbert D. Appleton, F.R.I.B.A., Architect.